FUJITSU

REFRIGERANT R32
INVERTER

AIR TO WATER

Comfort series

SERVICE MANUAL

OUTDOOR

WOYA100KLT

FUJITSU GENERAL LIMITED

SA_CF003EF_01
2021.03.01

Notices:

- Product specifications and design are subject to change without notice for future improvement.
- For further details, please check with our authorized dealer.

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REFRIGERANT R32
INVERTER

WATERSTAGE™
INNOVATIVE SOLUTION OF DOMESTIC HEATING

1. GENERAL INFORMATION UNIT

2021.03.01
SA_CH01_CF003EF_01

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1. GENERAL INFORMATION UNIT

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1. Specifications

1-1. Outdoor unit

■ Nominal capacity and nominal input

Model name			Hydraulic indoor unit		WSYA100ML3
			Outdoor unit		WOYA100KLT
Power supply					1 Ø 230 V ~ 50 Hz
-15°C/+45°C		Heating capacity	Nominal	kW	7.50
		Input power	Nominal	kW	3.75
		COP	Nominal		2.00
-10°C/+55°C		Heating capacity	Nominal	kW	7.10
		Input power	Nominal	kW	4.06
		COP	Nominal		1.75
-10°C/+35°C		Heating capacity	Nominal	kW	8.20
		Input power	Nominal	kW	3.35
		COP	Nominal		2.45
-7°C/+35°C		Heating capacity	Nominal	kW	8.90
		Input power	Nominal	kW	3.36
		COP	Nominal		2.65
-7°C/+55°C		Heating capacity	Nominal	kW	8.00
		Input power	Nominal	kW	4.10
		COP	Nominal		1.95
+2°C/+35°C	COP priority	Heating capacity	Nominal	kW	4.50
		Input power	Nominal	kW	1.14
		COP	Nominal		3.95
	Capacity priority	Heating capacity	Nominal	kW	9.30
		Input power	Nominal	kW	3.08
		COP	Nominal		3.02
+7°C/+35°C		Heating capacity	Minimum	kW	3.56
			Nominal		9.50
			Maximum		15.29
		Input power	Nominal	kW	2.11
		COP	Nominal		4.50
+7°C/+45°C		Heating capacity	Nominal	kW	9.00
		Input power	Nominal	kW	2.475
		COP	Nominal		3.45
+7°C/+55°C		Heating capacity	Nominal	kW	9.00
		Input power	Nominal	kW	3.33
		COP	Nominal		2.70
NOTE: Test conditions are complied with EN14511-2					

■ Technical specifications

Outdoor unit model name				WOYA100KLT
Enclosure		Material		Steel sheet
		Color		Beige Approximate color of Munsell 10YR 7.5/1.0NN
Dimensions (H × W × D)	Net		mm	998 × 940 × 320
	Gross			1,176 × 1,027 × 445
Weight	Net		kg	65
	Gross			71
Heat exchanger		Dimensions (H × W × D)	mm	966 × 905 × 36.38
		Fin pitch		1.45
		Rows × Stages		2 × 46
		Pipe type		Copper
		Fin type	Type (Material)	Corrugate (Aluminum)
			Surface treatment	Corrosion resistance
Fan	Airflow rate	Heating	m^3/h	4,130
	Type × Q'ty			Propeller fan × 1
	Discharge direction			Horizontal
	Motor quantity			1
	Motor output		W	120
Compressor	Type			DC 2 rotary × 1
	Motor output		W	2,180
Operation range	Heating	Minimum	°CDB	-20
		Maximum	°CWB	35
	Sanitary water	Minimum	°CDB	-20
		Maximum	°CWB	35
Refrigerant		Type (Global Warming Potential)		R32 (675)
		Charge	g	1,630
		Control		Expansion valve (electric type)
		Number of circuits		1
Refrigerant oil		Type		RmM68AF
		Charged volume	l	0.80
Connection pipe	Connection method	Liquid	mm	Flare connection
		Gas		Flare connection
	Size (standard)	Liquid	mm	Ø9.52
		Gas		Ø15.88
	Pre-charge length		m	20
	Max. length			30
	Min. length			3.0
	Additional refrigerant charge		g/m	20
	Max. height difference		m	20
	Defrost method			Reverse cycle
	Defrost control			Outdoor unit heat exchanger temperature sensor
Capacity control method				Inverter control

■ Product fiche

Model name	Hydraulic indoor unit		WSYA100ML3	
	Outdoor unit		WOYA100KLT	
Temperature application		°C	55	35
Declared load profile			—	—
Seasonal space heating energy efficiency class			A++	A+++
Water heating energy efficiency class			—	—
Rated heat output		kW	8	9
Supplementary heater		kW	3	3
Annual energy consumption		kWh	5,083	3,875
Annual electricity consumption		kWh	—	—
Annual fuel consumption		GJ	Not applicable	
Seasonal space heating energy efficiency		%	130	178
Water heating energy efficiency		%	—	—
Sound power level	Hydraulic unit	dB	40	—
Work only during off-peak hours			Not applicable	
Specific precautions in assembled, installed, or maintained			Refer to the installation and operating manuals.	
Rated heat output	Colder climate	kW	—	—
	Warmer climate	kW	8	8
Annual energy consumption	Colder climate	kWh	—	—
	Warmer climate	kWh	2,632	1,795
Annual electricity consumption	Colder climate	kWh	—	—
	Warmer climate	kWh	—	—
Seasonal space heating energy efficiency	Colder climate	%	—	—
	Warmer climate	%	162	235
Water heating energy efficiency	Colder climate	%	—	—
	Warmer climate	%	—	—
Sound power level	Outdoor unit	dB	62	—

NOTES:

- Product fiche according to Commission Delegated Regulation (EU) 811/2013
- Acoustic noise information:
  - The maximum sound pressure level is less than 70 dB (A) for both hydraulic unit and outdoor unit.
  - According to IEC 704-1 and ISO 3744.
- If the air to water heat pump is operated under higher temperature conditions than those listed, the built-in protection circuit may operate to prevent internal circuit damage. Also, during cooling modes, if the unit is used under conditions of lower temperatures than those listed above, the heat exchanger may freeze, leading to water leakage and other damage.
- Do not use this unit for any purposes other than the Heating and Cooling.

■ Product information

Model name		Hydraulic indoor unit		WSYA100ML3	
		Outdoor unit		WOYA100KLT	
Air-to-water heat pump				Yes	
Water-to-water heat pump				No	
Brine-to-water heat pump				No	
Low-temperature heat pump				No	
Equipped with a supplementary heater				Yes	
Heat pump combination heater				No*1	
Temperature application			°C	55	35
Rated heat output*2		P_{rated}	kW	8	9
Seasonal space heating energy efficiency		ηs	%	130	178
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature T_j					
T_j = –7°C		P_{dh}	kW	7.3	7.5
T_j = +2°C		P_{dh}	kW	4.4	4.6
T_j = +7°C		P_{dh}	kW	3.6	3.9
T_j = +12°C		P_{dh}	kW	7.3	7.5
T_j = bivalent temperature		P_{dh}	kW	7.1	7.3
T_j = operation limit temperature		P_{dh}	kW	55	35
T_j = –15°C (if TOL < –20°C)		P_{dh}	kW	—	—
Bivalent temperature		T_{biv}	°C	-7	-7
Cycling interval capacity for heating		P_{cych}	kW	Not applicable	
Degradation co-efficient*3		C_{dh}		0.9	0.9
Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature T_j					
T_j = –7°C		COP_d		2.05	2.98
T_j = +2°C		COP_d		3.24	4.46
T_j = +7°C		COP_d		4.47	5.89
T_j = +12°C		COP_d		5.97	7.14
T_j = bivalent temperature		COP_d		2.05	2.98
T_j = operation limit temperature		COP_d		1.72	2.71
T_j = –15°C (if TOL < –20°C)		COP_d		—	—
Operation limit temperature		TOL	°C	-10	-10
Cycling interval efficiency		COP_{cyc}		Not applicable	
Heating water operating limit temperature		WTOL	°C	55	55
Power consumption in modes other than active mode					
Off mode		P_{OFF}	kW	0.004	0.004
Thermostat-off mode		P_{TO}	kW	0.021	0.020
Standby mode		P_{SB}	kW	0.008	0.008
Crankcase heater mode		P_{CK}	kW	0.000	0.000
Supplementary heater					
Rated heat output*2		P_{SUP}	kW	1.1	1.2
Type of energy input				Electric	
Other items					
Capacity control				Variable	
Sound power level	Indoor unit	L_{WA}	dB	40	—
	Outdoor unit	L_{WA}	dB	62	—
Annual energy consumption		Q_{HE}	kWh	5,083	3,875
Emissions of nitrogen oxides		NO_x	mg/kWh		
Rated airflow rate	Outdoor unit		m^3/h	4,130	4,130
Declared load profile				—	—
Daily electricity consumption		Q_{elec}	kWh	—	—
Annual energy consumption		AEC	kWh	—	—
Water heating energy efficiency		η_{wh}	%	—	—
Daily fuel consumption		Q_{fuel}	kWh	Not applicable	
Contact details				FUJITSU GENERAL (EURO) GmbH Fritz-Vomfelde-Straße 26-32, 40547 Düsseldorf, Germany	

NOTES:

- Product information according to Commission Delegated Regulation (EU) 811/2013
- Product information is based on the average climate condition.
- *1: When using an optional component, this function is available.
- *2: For heat pump space heaters and heat pump combination heaters, the rated heat output P_{rated} is equal to the design load for heating $P_{designh}$, and the rated heat output of a supplementary heater P_{sup} is equal to the supplementary capacity for heating sup (T_j).
- *3: If C_{dh} is not determined by measurement then the default degradation coefficient is C_{dh} = 0.9.

● Energy efficiency value

Application: 35°C				
Model name	**Hydraulic indoor unit**		**WSYA100ML3**	
	Outdoor unit		**WOYA100KLT**	
Seasonal energy efficiency of heat pump for space heating		%	178	
Type of temperature control				
Outdoor sensor (included in the package)			II	—
Modulating room thermostat (outdoor sensor included in the package)			—	IV
Bonus		%	2	4
Seasonal space heating energy efficiency of package in average climate conditions		%	180	182
Energy class of the packages			A+++	A+++
Seasonal space heating energy efficiency of package in warmer climate conditions		%	237	239
Seasonal space heating energy efficiency of package in colder climate conditions		%	—	—

Application: 55°C				
Model name	**Hydraulic indoor unit**		**WSYA100ML3**	
	Outdoor unit		**WOYA100KLT**	
Seasonal energy efficiency of heat pump for space heating		%	130	
Type of temperature control				
Outdoor sensor (included in the package)			II	—
Modulating room thermostat (outdoor sensor included in the package)			—	IV
Bonus		%	2	4
Seasonal space heating energy efficiency of package in average climate conditions		%	132	134
Energy class of the packages			A++	A++
Seasonal space heating energy efficiency of package in warmer climate conditions		%	164	166
Seasonal space heating energy efficiency of package in colder climate conditions		%	—	—

● Class of temperature controller

Controller class		II	VI
Contribution to energy efficiency	%	2	4
NOTE: Controller class VI: UTW-C55XA, UTW-C58XD, UTW-C74TXF, UTW-C74HXF, UTW-C78XD			

■ Electrical specifications

Outdoor unit model name				**WOYA100KLT**
Available voltage range				198—264 V
Power supply		Voltage	V	1 Ø 230
		Frequency	Hz	50
Maximum operating current*1		Heating	A	19.0
Wiring spec.*2	Main fuse (circuit breaker) current		A	30
	Power cable		mm^2	4.0 or more
	Transmission cable	Size	mm^2	1.5 or more
		Max. length	m	31
Wiring connections quantity*3		For power supply		3
		For connection with indoor		4

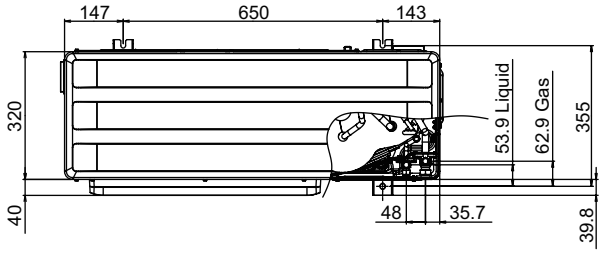
NOTES:
- *1: Maximum operating current is the total current of the indoor unit and the outdoor unit.
- *2: Selected based on Japan Electrotechnical Standard and Codes Committee E0005.
- *3: Included earth wiring.

2. Dimensions

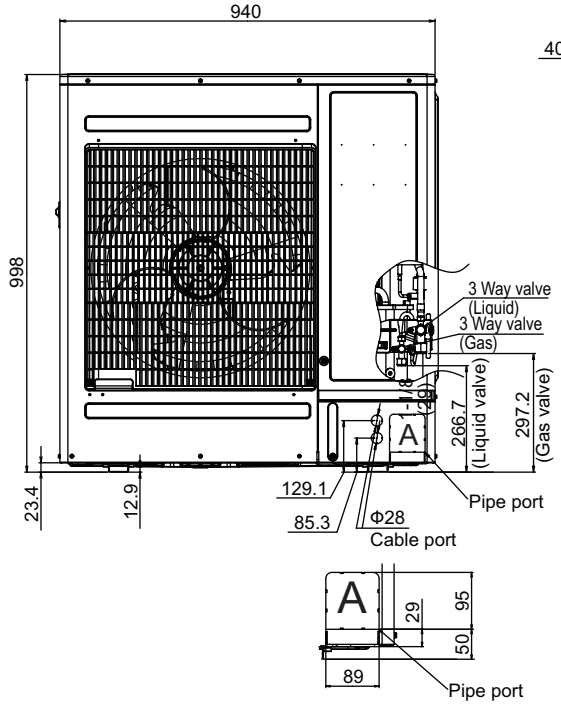
2-1. Outdoor unit

■ Model: WOYA100KLT

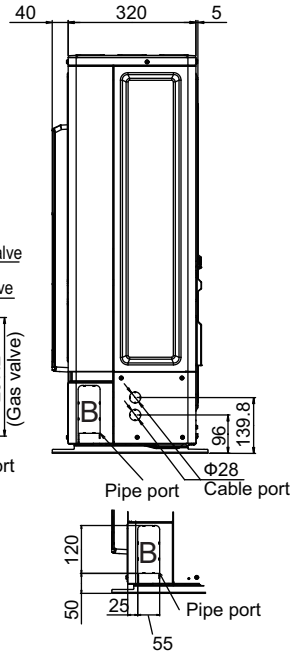
Unit: mm



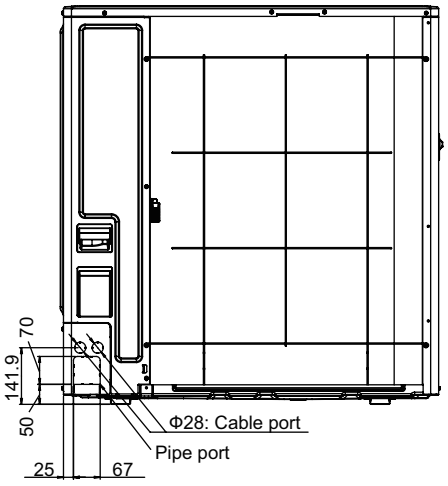
Top view



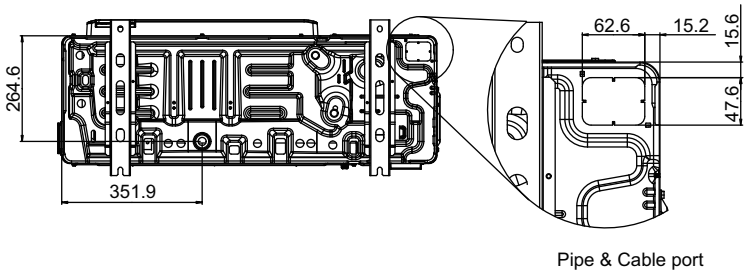
Front view



Side view



Rear view



Bottom view

REFRIGERANT R32
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2. TECHNICAL DATA AND PARTS LIST

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2. TECHNICAL DATA AND PARTS LIST

1. Outdoor unit parts list.....02-1

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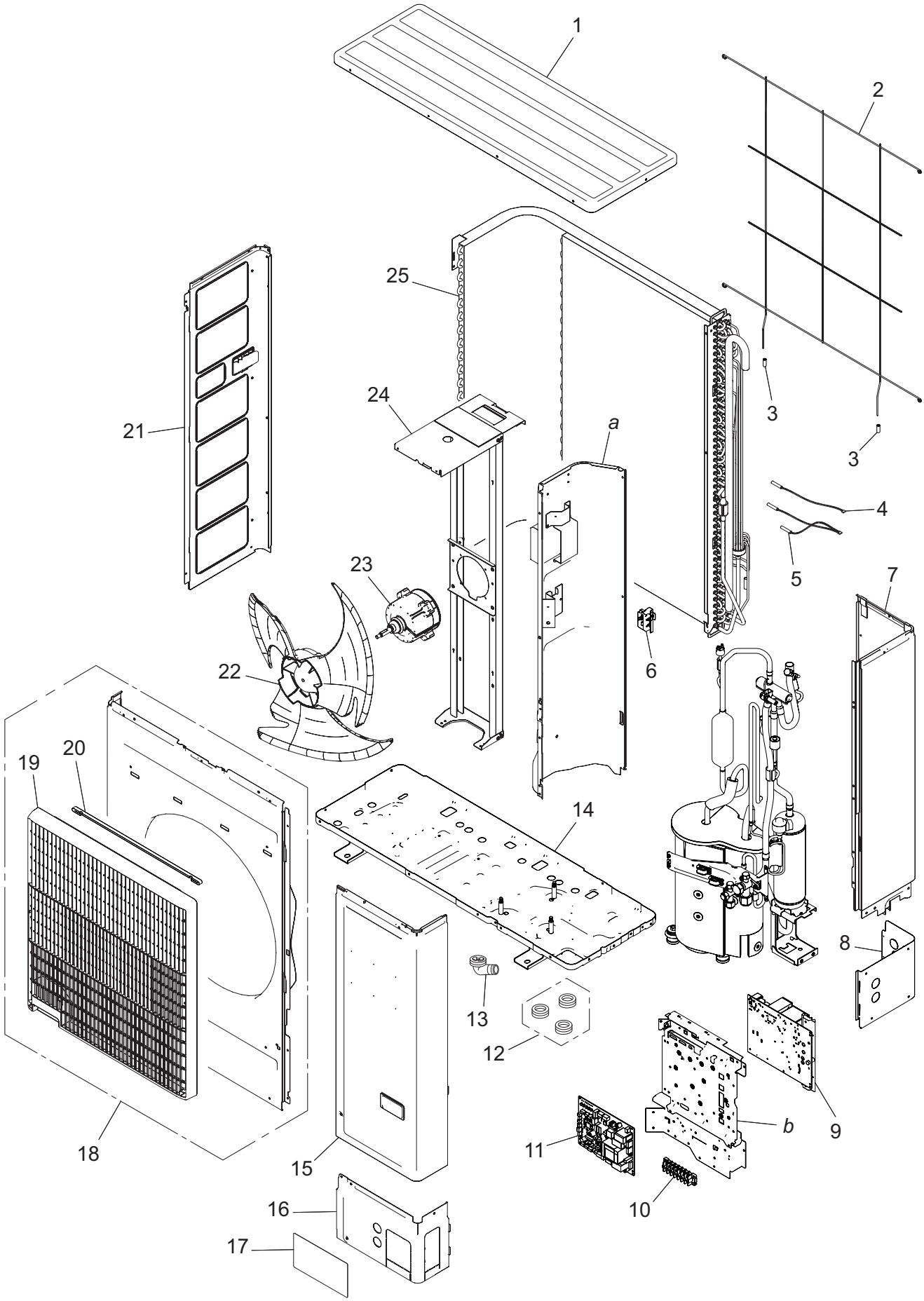
1. Outdoor unit parts list

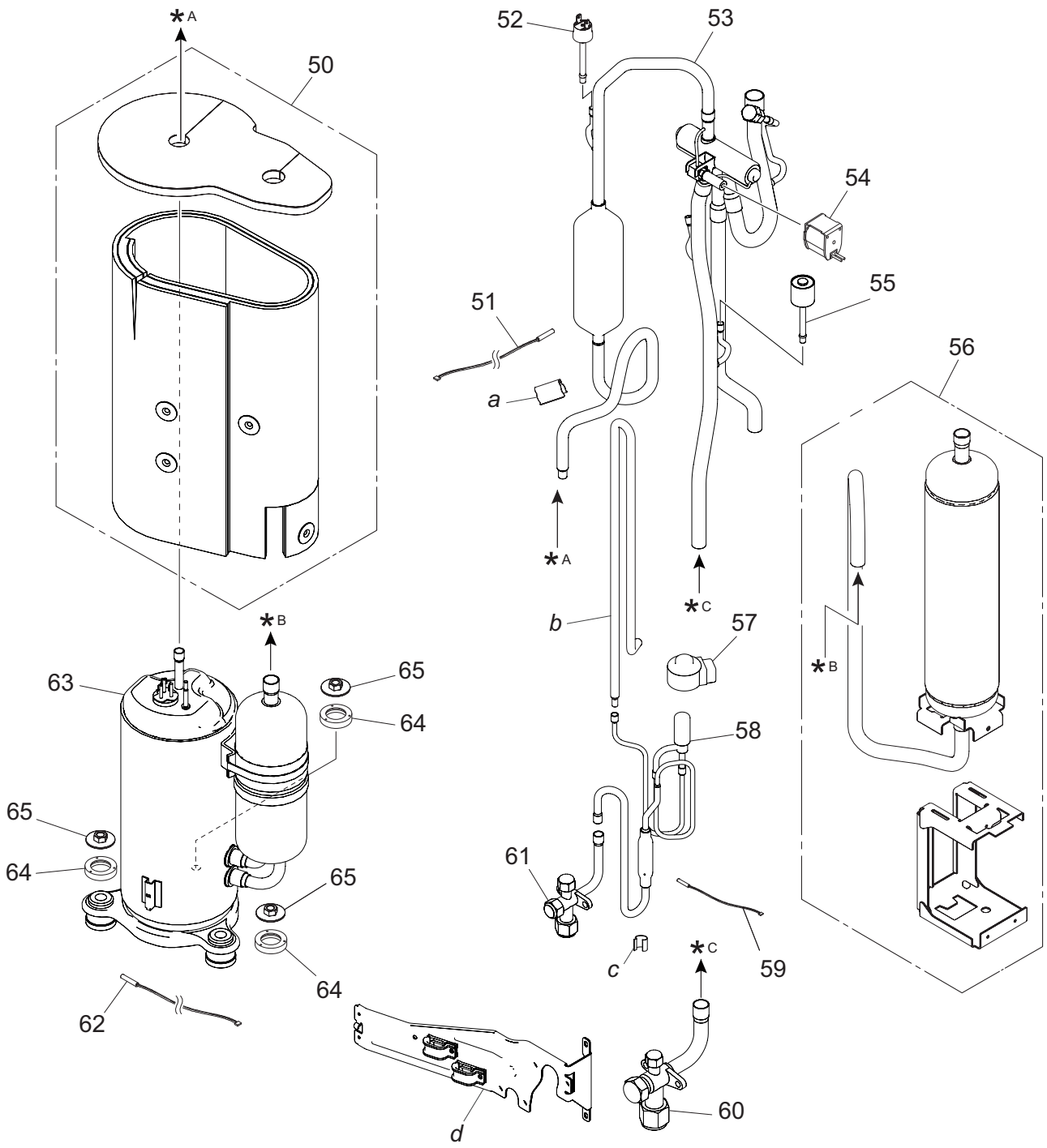
1-1. Model: WOYA100KLT

■ Exterior parts and chassis



Item no.	Part no.	Part name	Service part
1	9383880001	Top panel assy	♦
2	9381013005	Protective net	♦
3	9375361013	Net rubber	♦
4	9900984038	Thermistor (Heat exchanger)	♦
5	9900727154	Thermistor assy	♦
6	9383607004	Thermo holder	♦
7	9383874017	Right panel sub assy	♦
8	9383879005	Rear pipe cover	♦
9	9709684115	Inverter PCB	♦
10	9900203061	Terminal	♦
11	9711431370	Main PCB	♦
12	313166024302	Drain cap	♦
13	9303029015	Drain assy	♦
14	9350255009	Base assy	♦
15	9383876011	Service panel sub assy	♦
16	9383878008	Front pipe cover	♦
17	9351355005	Emblem rear	♦
18	9383863011	Front panel assy	♦
19	9383604003	Blow grille	♦
20	9383689000	Blow grille insulation	♦
21	9383882012	Left panel sub assy	♦
22	9383336003	Propeller fan	♦
23	9603733018	Brushless motor	♦
24	9383862021	Motor bracket assy	♦
25	9374420636	Condenser sub assy	♦
—	9711332004	Wire with terminal (Power wire L)	♦
—	9711332011	Wire with terminal (Power wire N)	♦
—	9711205001	Wire with connector (P350 on Main PCB—P351 on Inverter PCB)	♦
—	9711203007	Wire with connector (P660 on Main PCB—P662 on Inverter PCB)	♦
—	9711204004	Wire with connector (P661 on Main PCB—P663 on Inverter PCB)	♦
—	9711214003	Wire with connector (Pressure switch)	♦
—	9711213006	Wire with connector (P770 on Inverter PCB [for Pressure switch])	♦
—	9711212009	Wire with connector (P650 on Inverter PCB—Fan motor)	♦
—	9711198006	Wire with terminal (P400 [U], P401 [V], P402 [W] on Inverter PCB—Compressor)	♦
a	—	Separate wall assy	—
b	—	Control box unit	—

■ Compressor


*A
50
52
53
54
55
51
a
56
*A
*C
b
57
*B
*B
63
65
64
58
65
64
61
65
64
c
*C
59
62
60
d

Item no.	Part no.	Part name	Service part
50	9383858017	Sound insulation unit	♦
51	9900565091	Thermistor (Outdoor temp.)	♦
52	9900186029	Pressure switch	♦
53	9374425709	4-way valve assy	♦
54	9970110153	Solenoid	♦
55	9970178122	Pressure sensor	♦
56	9384848024	Accumulator assy	♦
57	9970095030	Expansion valve coil	♦
58	9370947366	Expansion valve assy	♦
59	9901065026	Thermistor (EEV)	♦
60	9379079013	3-way valve assy	♦
61	9377958037	3-way valve assy	♦
62	9900985028	Thermistor (Compressor)	♦
63	9810791009	Compressor	♦
64	9379179089	Rubber washer F	♦
65	9377973016	Special nut	♦
a	—	Thermistor spring	—
b	—	Joint pipe D	—
c	—	Thermistor spring	—
d	—	Wiring fixation unit	—

TECHNICAL DATA AND PARTS LIST

REFRIGERANT R32
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3. TROUBLESHOOTING

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1 ERROR DISPLAY

1-1 HYDRAULIC UNIT DISPLAY

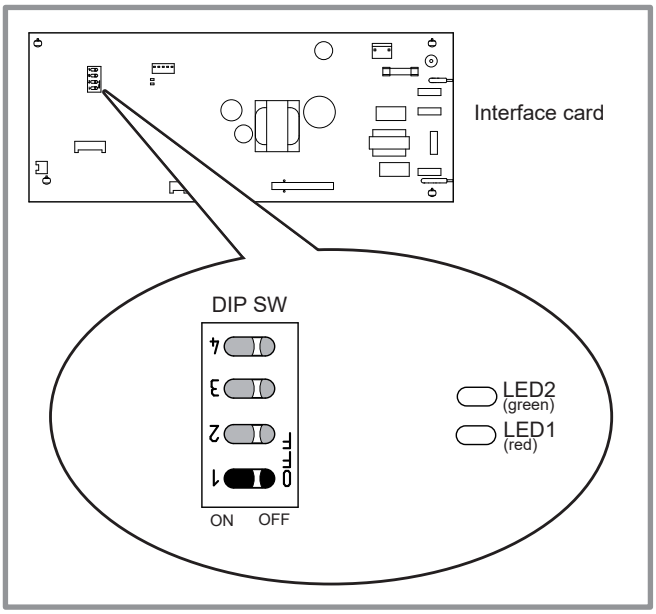


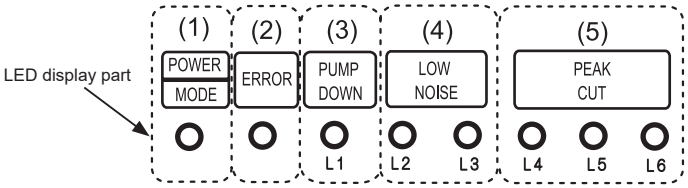
figure 1 - Location of DIP switches and diodes on the hydraulic unit interface card

LED display		*Error contents*	*Troubleshooting*
LED 2 (green)	*LED 1 (red)*		
◆1	◆1	Serial communication error	1, 2
◆2	◆3	Combination error	3
◆3	◆2	UART communication error	4
◆4	◆2	Hydraulic unit heat exchanger thermistor error	5
◆6	◆2	Outdoor unit main PCB error	6
◆6	◆3	Inverter PCB error	7
◆6	◆5	IPM error	8
◆7	◆1	Discharge thermistor error	9
◆7	◆2	Compressor thermistor error	10
◆7	◆3	Outdoor unit heat exchanger thermistor error	11
◆7	◆4	Outdoor thermistor error	12
◆7	◆7	Heatsink thermistor error	13
◆7	◆8	Electric expansion valve thermistor error	14
◆8	◆4	Current sensor error	15
◆8	◆6	Pressure sensor error	16
◆9	◆4	Trip detection	17
◆9	◆5	Compressor motor control error	18
◆9	◆7	Outdoor unit fan motor error	19
◆10	◆1	Discharge temperature error	20
◆10	◆3	Compressor temperature error	21
◆10	◆5	Pressure error	22
◆ 10	◆ 12	Heatsink temperature error	23

◆1 ~ ◆12 : 1~ 12 Times Blinking

1-2 OUTDOOR UNIT DISPLAY

You can determine the operating status by the lighting up and blinking of the LED lamp.



Display when an error occurs.

POWER/ MODE	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT		
		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)
●	Blink (Hi speed)	○	○	○	○	○	○

Sign "○": Lights off, "●": Lights on

(1) Check that the "ERROR" LED blinks, then press the "ENTER" button once.

(2) For details, refer to the following table.

Check that the "ERROR" LED blinks, then press the [Enter] button once.
For details, refer to the following table.

○ : Light OFF ● : Light ON ◆1 ~ ◆12 : 1~ 12 Times Blinking

LED display								Error contents	TROUBLE-SHOOTING
POWER/ MODE	ERROR	PUMP DOWN	LOW NOISE		PEAK CUT				
		(L1)	(L2)	(L3)	(L4)	(L5)	(L6)		
◆(2)	●	◆(1)	◆(1)	○	○	●	●	Serial communication error	2
◆(2)	●	◆(1)	◆(1)	○	●	○	○		
◆(2)	●	◆(2)	◆(3)	○	○	○	●	Combination error	3
◆(2)	●	◆(6)	◆(2)	○	○	○	●	Outdoor unit main PCB error	6
◆(2)	●	◆(6)	◆(3)	○	○	○	●	Inverter PCB error	7
◆(2)	●	◆(6)	◆(5)	○	○	○	●	IPM error	8
◆(2)	●	◆(6)	◆(5)	○	○	●	●		
◆(2)	●	◆(7)	◆(1)	○	○	○	●	Discharge thermistor error	9
◆(2)	●	◆(7)	◆(2)	○	○	○	●	Compressor thermistor error	10
◆(2)	●	◆(7)	◆(3)	○	○	●	○	Outdoor unit heat exchanger thermistor error	11
◆(2)	●	◆(7)	◆(3)	○	○	●	●		
◆(2)	●	◆(7)	◆(4)	○	○	○	●	Outdoor thermistor error	12
◆(2)	●	◆(7)	◆(7)	○	○	○	●	Heatsink thermistor error	13
◆(2)	●	◆(7)	◆(8)	○	○	○	●	Electric expansion valve thermistor error	14
◆(2)	●	◆(8)	◆(4)	○	○	○	●	Current sensor error	15
◆(2)	●	◆(8)	◆(6)	○	●	○	○	Pressure sensor error 1	16-1
◆(2)	●	◆(8)	◆(6)	○	●	●	○	Pressure sensor error 2	16-2
◆(2)	●	◆(9)	◆(4)	○	○	○	●	Trip detection	17
◆(2)	●	◆(9)	◆(5)	○	○	○	●	Compressor motor control error	18
◆(2)	●	◆(9)	◆(7)	○	○	●	●	Outdoor unit fan motor error	19
◆(2)	●	◆(10)	◆(1)	○	○	○	●	Discharge temperature error	20
◆(2)	●	◆(10)	◆(3)	○	○	○	●	Compressor temperature error	21
◆(2)	●	◆(10)	◆(5)	○	○	○	●	Pressure error	22
◆(2)	●	◆(10)	◆(12)	○	○	●	●	Heatsink temperature error	23

2 TROUBLESHOOTING WITH ERROR CODE

Troubleshooting 1 **OUTDOOR UNIT Error Method:** **Serial communication error (Serial Reverse Transfer Error)**	**Indicate or Display:** **Hydraulic unit :** Green: ◆1, Red: ◆1 ◆n : n times blinking **Outdoor unit : No indication**

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB Outdoor unit fan motor	When the hydraulic unit cannot receive the serial signal from Outdoor unit more than 2minutes after power ON, or the hydraulic unit cannot receive the serial signal more than 15seconds during normal operation.

Forecast of Cause:

1. Connection failure 2. External cause 3. Main PCB failure 4. Outdoor unit fan motor failure

Check Point 1-1 : Reset the power and operate

- Does Error indication show again?

NO → **Check Point 1-2: Check external cause such as noise**

- Check the complete insulation of the grounding.
- Check if there is any equipment that causes harmonic wave near the power cable (Neon light bulb or any electronic equipment which causes harmonic wave).

YES ↓

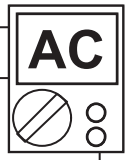
Check Point 2 : Check Connection

- Check any loose or removed connection line of Hydraulic unit and Outdoor unit.
  >> **If there is an abnormal condition, correct it by referring to Installation Manual or Data & Technical Manual.**

OK ↓

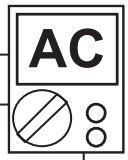
Check Point 3 : Check the voltage of power supply

- Check the voltage of power supply
  >> **Check if AC198V (AC220V -10%) - 264V (AC240V +10%) appears at Outdoor Unit Terminal L - N.**

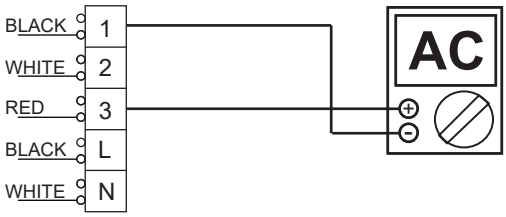


OK ↓

Check Point 4 : Check Serial Signal (Reverse Transfer Signal)



- Check Serial Signal (Reverse Transfer Signal)
  >> **Check if Indicated value swings between AC90V and AC270V at Outdoor Unit Terminal 1 - 3.**
  >> **If it is abnormal, Check Outdoor unit fan motor (PARTS INFORMATION 4)**
  >> **If Outdoor fan motor is abnormal, replace Outdoor unit fan motor and Main PCB.**
  >> **If Outdoor fan motor is normal, replace Main PCB.**



Troubleshooting 2
HYDRAULIC UNIT Error Method:

Serial communication error
(Serial Forward Transfer Error)

Indicate or Display:

Hydraulic unit :

Green	Red
◆1	◆1

◆n : n times blinking

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆1	◆1	○	○/●	●/○	●/○

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:

Hydraulic unit interface PCB

Detective details:

When the outdoor unit cannot properly receive the serial signal from hydraulic unit for 10 seconds or more.

Forecast of Cause:

1. Connection failure 2. External cause

Check Point 1-1 : Reset the power and operate

- Does Error indication show again?

NO → Check Point 1-2: Check external cause such as noise

- Check if the ground connection is proper.
- Check if there is any equipment that causes harmonic wave near the power cable (Neon light bulb or any electronic equipment which causes harmonic wave).

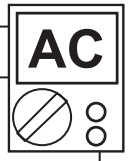
YES ↓

Check Point 2 : Check Connection

- Check any loose or removed connection line of hydraulic unit and Outdoor unit.
  >> If there is an abnormal condition, correct it by referring to Installation Manual or Data & Technical Manual.
- Check connection condition in control unit.
  (If there is loose connector, open cable or mis-wiring)

OK ↓

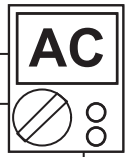
Check Point 3 : Check the voltage of power supply



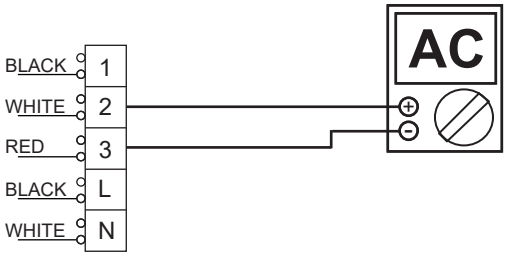
- Check the voltage of power supply
  >> Check if AC198V (AC220V -10%) - 264V (AC240V +10%) appears at Outdoor Unit Terminal L - N.

OK ↓

Check Point 4 : Check Serial Signal (Forward Transfer Signal)



- Check Serial Signal (Forward Transfer Signal)
  >> Check if indicated value swings berween AC30v and AC130V at outdoor unit terminal 2 - 3.
  >> If it is abnormal, replace interface PCB.



Troubleshooting 3
HYDRAULIC UNIT Error Method:

Combination error

Indicate or Display:

Hydraulic unit :

Green	Red
◆2	◆3

◆n : n times blinking

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆2	◆3	○	○	○	●

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:

Hydraulic unit

Detective details:

1. The outdoor unit receives the serial signal of applied refrigerant information from hydraulic unit. When the refrigerant is R410a.
2. The combination of hydraulic unit and outdoor unit isn't allowed.

Forecast of Cause:

1. The combination of hydraulic unit and outdoor unit is incorrect

Check Point 1 : Check the type of hydraulic unit

- Check the type of the connected hydraulic unit and outdoor unit.
  >> If abnormal condition is found, correct it.

OK

Check Point 2 : Replace Main PCB

▶ **If Check Point 1 do not improve the symptom, replace Main PCB of Outdoor unit.**

Troubleshooting 4 **HYDRAULIC UNIT Error Method:** **UART communication error**	**Indicate or Display:** **Hydraulic unit :** Green: ◆3, Red: ◆2 ◆n : n times blinking **Outdoor unit : No indication**

Detective Actuators:	**Detective details:**
Hydraulic unit Interface PCB Hydraulic unit Main PCB	When the UART connection fails for 25 seconds.

Forecast of Cause:

1. Connection failure 2. External cause 3. Main PCB failure 4. Interface PCB failure

Check Point 1-1 : Reset the power and operate

- Does Error indication show again?

YES

Check Point 2 : Check Connection

- Check any loose or removed connector between Main PCB in Hydraulic unit and Interface PCB.
  >> If it doesn't work, replace the connector between Main PCB and Interface PCB.
  >> If it doesn't work, replace the Main PCB and Interface PCB.

NO

Check Point 1-2: Check external cause such as noise

- Check the complete insulation of the grounding.
- Check if there is any equipment that causes harmonic wave near the Hydraulic unit (Neon light bulb or any electronic equipment which causes harmonic wave).

Troubleshooting 5 **HYDRAULIC UNIT Error Method:** Hydraulic unit Heat Exchanger Thermistor Error	**Indicate or Display:** **Hydraulic unit :** Green: ◆4, Red: ◆2 ◆n : n times blinking **Outdoor unit : No indication**

Detective Actuators:	**Detective details:**
Hydraulic unit interface PCB Circuit Heat Exchanger Thermistor	Hydraulic unit thermistor is open or short is detected always.

Forecast of Cause :

1. Connector failure connection 2. Thermistor failure 3. Interface PCB failure

Check Point 1 : Check connection of Connector

- ☐ Check if connector is loose or removed
- ☐ Check erroneous connection
- ☐ Check if thermistor cable is open

>>Reset Power when reinstalling due to removed connector or incorrect wiring.

OK

Check Point 2 : Remove connector and check Thermistor resistance value

Thermistor Characteristics(Rough value)

Temperature (°C)	-30	-25	-20	-15	-10	-5	0	5	10	15
Resistance value (kΩ)	1131.9	804.5	579.6	422.9	312.3	233.2	176.0	134.2	103.3	80.3

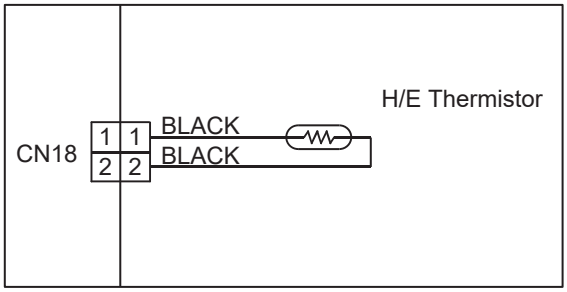
Temperature (°C)	20	25	30	35	40	45	50	55	60	65
Resistance value (kΩ)	62.9	49.7	39.6	31.7	25.6	20.8	17.1	14.1	11.6	9.7

▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

Check Point 3 : Check Voltage of Interface PCB (DC 5.0V)

Make sure circuit diagram of each hydraulic unit and check terminal voltage at Thermistor (DC5.0V)



▶ **If the voltage does not appear, replace Interface PCB and execute the check operation again.**

Troubleshooting 6
OUTDOOR UNIT Error Method:

Outdoor unit main PCB error

Indicate or Display:

Hydraulic unit :

Green	Red
◆6	◆2

◆n : n times blinking

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆6	◆2	○	○	○	●

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:

Outdoor unit Main PCB

Detective details:

Access to EEPROM failed due to some cause after outdoor unit started.

Forecast of Cause:

1. External cause (Noise, temporary open, voltage drop) 2. Main PCB failure

Check Point 1-1 : Reset Power Supply and operate

・Does Error indication show again?

NO → Check Point 1-2 : Check external cause

- Check if temporary voltage drop was not generated.
- Check if momentary open was not generated.
- Check if ground is connection correctly or there are no related cables near the power line.

YES → Check Point 2 : Replace Main PCB

▶ **Change Main PCB.**

Troubleshooting 7
OUTDOOR UNIT Error Method:

Inverter PCB error

Indicate or Display:

Hydraulic unit :

Green	Red
◆6	◆3

◆n : n times blinking

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆6	◆3	○	○	○	●

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:

Outdoor unit Inverter PCB

Detective details:

- Error information received from Outdoor unit Inverter PCB

Forecast of Cause :

1. External cause.
2. Power supply to Inverter PCB wiring disconnection, open
3. Outdoor unit Inverter PCB failure
4. Outdoor unit Main PCB failure

Check Point 1-1 : Turn the power on again?

- Error displayed again?

NO → Check Point 1-2: External cause

- Check if temporary voltage drop was not generated.
- Check if temporary open was not generated.
- Check if ground is connected correctly or there are no related cables near the power line.

YES ↓

Check Point 2 : Check the wiring

- Connector and wiring connection state check
- Cable open check

OK ↓

Check Point 3 : Replace Inverter PCB

- Replace Outdoor unit Inverter PCB.

OK ↓

Check Point 4 : Replace Main PCB

▶ **If Check Point 1~3 do not improve the symptom, change Main PCB.**

Troubleshooting 8

OUTDOOR UNIT Error Method:

IPM error

Indicate or Display:

Hydraulic unit :

Green	Red
◆6	◆5

◆n : n times blinking

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆6	◆5	○	○	○/●	●/●

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:

Outdoor unit Inverter PCB

Detective details:

When the signal from FO terminal of IPM is "L"(=0V) while the compressor stops.

Forecast of Cause:

1. Outdoor unit Inverter PCB failure

Check Point 1 : Replace Inverter PCB

▶ **Replace Outdoor unit Inverter PCB.**

Troubleshooting 9 **OUTDOOR UNIT Error Method:** **Discharge Thermistor Error**	**Indicate or Display:** **Hydraulic unit :** Green: ◆7, Red: ◆1 ◆n : n times blinking **Outdoor unit :** Mode: ◆2, Error: ●, L1: ◆7, L2: ◆1, L3: ○, L4: ○, L5: ○, L6: ● ○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Discharge temperature thermistor	・Discharge temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection failure, open
2. Thermistor failure
3. Main PCB failure

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

↓ **OK**

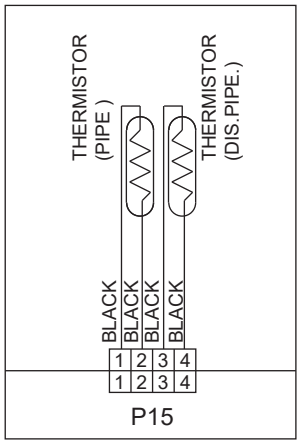
Check Point 2 : Check the thermistor

- ☐ Thermistor characteristics check
  (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 5".

↓ **OK**

Check Point 3 : Check voltage of Main PCB (DC5.0V)

- ☐ Main PCB P15:3-4 voltage value =5V
  Remove the thermistor from Main PCB, check the voltage.



►**If the voltage does not appear, replace Main PCB, and execute the check operation again.**

Troubleshooting 10 **OUTDOOR UNIT Error Method:** **Compressor Thermistor Error**	**Indicate or Display:** **Hydraulic unit :** Green: ◆7, Red: ◆2 ◆n : n times blinking **Outdoor unit :** Mode: ◆2, Error: ●, L1: ◆7, L2: ◆2, L3: ○, L4: ○, L5: ○, L6: ● ○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Compressor temperature thermistor	・Compressor temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection failure, open
2. Thermistor failure
3. Main PCB failure

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

OK

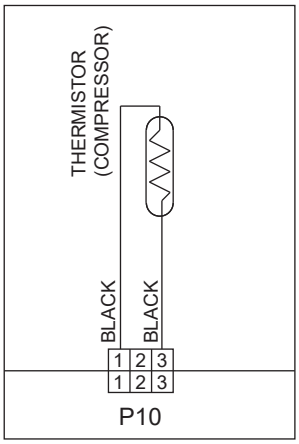
Check Point 2 : Check the thermistor

- ☐ Thermistor characteristics check
  (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 5".

OK

Check Point 3 : Check voltage of Main PCB (DC5.0V)

- ☐ Main PCB P10:1-3 voltage value =5V
  Remove the thermistor from Main PCB, check the voltage.



▶ **If the voltage does not appear, replace Main PCB, and execute the check operation again.**

Troubleshooting 11 **OUTDOOR UNIT Error Method:** Outdoor unit Heat Exchanger Thermistor Error	**Indicate or Display:** **Hydraulic unit :** Green: ◆7 / Red: ◆3 ◆n : n times blinking **Outdoor unit :** Mode: ◆2 / Error: ● / L1: ◆7 / L2: ◆3 / L3: ○ / L4: ○ / L5: ●/● / L6: ○/● ○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Heat exchanger Outlet / Middle temperature thermistor	・Heat exchanger outlet temperature thermistor short or open detected ・Heat exchanger middle temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection failure, open
2. Thermistor failure
3. Main PCB failure

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

↓ **OK**

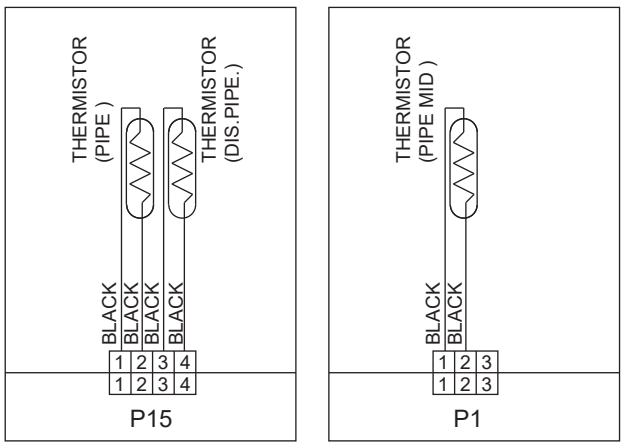
Check Point 2 : Check the thermistor

- ☐ Thermistor characteristics check
  (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 5".

↓ **OK**

Check Point 3 : Check voltage of Main PCB (DC5.0V)

- ☐ Main PCB P15:1-2 voltage value =5V
  Main PCB P1 :1-2 voltage value =5V
  Remove the thermistor from Main PCB, check the voltage.



►**If the voltage does not appear, replace Main PCB, and execute the check operation again.**

Troubleshooting 12 **OUTDOOR UNIT Error Method:** **Outdoor Thermistor Error**	**Indicate or Display:** **Hydraulic unit :** Green: ◆7, Red: ◆4 ◆n : n times blinking **Outdoor unit :** Mode: ◆2, Error: ●, L1: ◆7, L2: ◆4, L3: ○, L4: ○, L5: ○, L6: ● ○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Outdoor temperature thermistor	・Outdoor temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection failure, open
2. Thermistor failure
3. Main PCB failure

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

OK

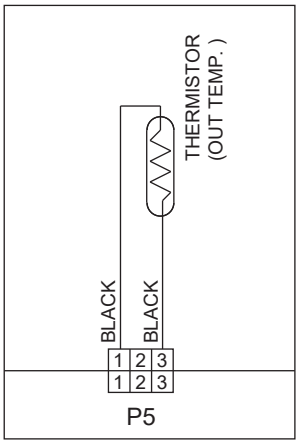
Check Point 2 : Check the thermistor

- ☐ Thermistor characteristics check
  (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 5".

OK

Check Point 3 : Check voltage of Main PCB (DC5.0V)

- ☐ Main PCB P5:1-3 voltage value =5V
  Remove the thermistor from Main PCB, check the voltage.



►**If the voltage does not appear, replace Main PCB, and execute the check operation again.**

Troubleshooting 13 **OUTDOOR UNIT Error Method:** **Heatsink Thermistor Error**	**Indicate or Display:** **Hydraulic unit :** Green: ◆7, Red: ◆7 ◆n : n times blinking **Outdoor unit :** Mode: ◆2, Error: ●, L1: ◆7, L2: ◆7, L3: ○, L4: ○, L5: ○, L6: ● ○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Heatsink temperature thermistor	・Heatsink temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection failure, open
2. Thermistor failure
3. Inverter PCB failure

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

OK

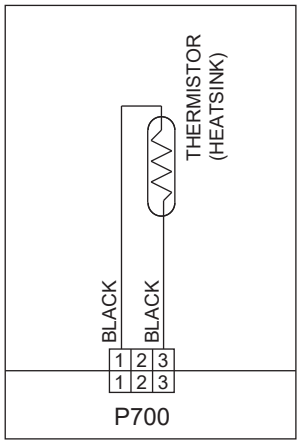
Check Point 2 : Check the thermistor

- ☐ Thermistor characteristics check
  (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 5".

OK

Check Point 3 : Check voltage of Inverter PCB (DC5.0V)

- ☐ Main PCB P700:1-3 voltage value =5V
  Remove the thermistor from Inverter PCB, check the voltage.



▶ **If the voltage does not appear, replace Inverter PCB, and execute the check operation again.**

Troubleshooting 14 **OUTDOOR UNIT Error Method:** **Electric expansion valve Thermistor Error**	**Indicate or Display:** **Hydraulic unit :** Green: ◆7 / Red: ◆8 ◆n : n times blinking **Outdoor unit :** Mode: ◆2 / Error: ● / L1: ◆7 / L2: ◆8 / L3: ○ / L4: ○ / L5: ○ / L6: ● ○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Expansion valve temperature thermistor	・ Expansion valve temperature thermistor short or open detected

Forecast of Cause :
1. Connector connection defective, open
2. Thermistor failure
3. Main PCB failure

Check Point 1 : Check the connector connection and cable open

- ☐ Connector connection state check
- ☐ Cable open check

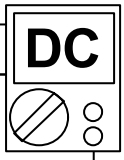
↓ **OK**

Check Point 2 : Check the thermistor

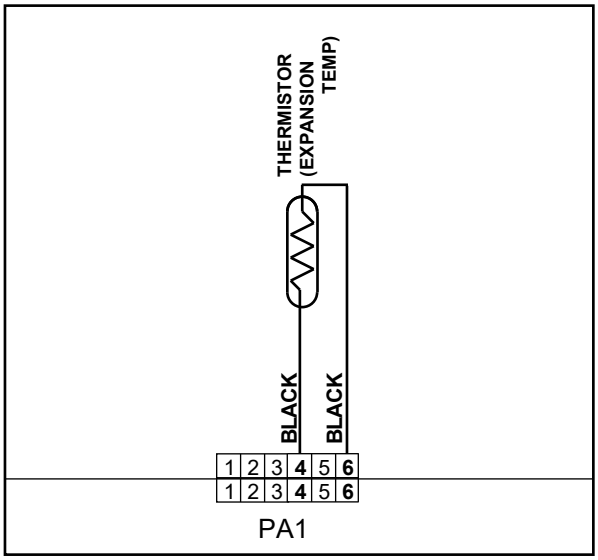
- ☐ Thermistor characteristics check (Disconnect the thermistor from the PCB and check.)
  * For the thermistor characteristics, refer to the "Service Parts Information 5".

↓ **OK**

Check Point 3 : Check voltage of Main PCB (DC5.0V)



- ☐ Main PCB (PA1:4-6) voltage value = 5V
  Remove the thermistor from Main PCB, check the voltage.



Expansion valve temperature thermistor (PA1:4-6)

▶ **If the voltage do not appear, replace Main PCB, and execute the check operation again.**

Troubleshooting 15

OUTDOOR UNIT Error Method:

Current sensor error

Indicate or Display:

Hydraulic unit :

Green	Red
◆8	◆4

◆n : n times blinking

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆8	◆4	○	○	○	●

○ : Light OFF ● : Light ON ◆n : n times blinking

Detective Actuators:

Outdoor unit Inverter PCB

Detective details:

When Input Current Sensor has detected 1A or less,
while Inverter Compressor is operating at higher than 50rps,
after 1minute upon starting the Compressor.
(Except during the defrost operation)

Forecast of Cause :

1. Defective connection of electric components 2. External cause 3. Inverter PCB failure

Check Point 1-1 : Reset Power Supply and operate

・Does Error indication show again?

NO → Check Point 1-2

YES ↓

Check Point 2 :
Check connections of Outdoor Unit Electrical Components

・Check if the terminal connection is loose.
・Check if connector is removed.
・Check erroneous connection.
・Check if cable is open.
>>Upon correcting the removed connector or mis-wiring, reset the power.

OK ↓

Check Point 3 : Replace Inverter PCB

▶ **If Check Point 1, 2 do not improve the symptom, change Inverter PCB.**

Check Point 1-2 :
Check external cause at hydraulic and outdoor unit (Voltage drop or noise)

・Instant drop : Check if there is a large load electric apparatus in the same circuit.

・Momentary power failure : Check if there is a defective contact or leak current in the power supply circuit.

・Noise : Check if there is any equipment causing harmonic wave near electric line.(Neon bulb or electric equipment that may cause harmonic wave)
Check the complete insulation of grounding.

Troubleshooting 16-1 **OUTDOOR UNIT Error Method:** **Pressure sensor error**	**Indicate or Display:** **Hydraulic unit :** Green: ◆8, Red: ◆6 ◆n : n times blinking **Outdoor unit :** Mode: ◆2, Error: ●, L1: ◆8, L2: ◆6, L3: ○, L4: ●, L5: ○, L6: ○ ○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
High pressure switch	When the power was turned on, "high pressure switch : open" was detected.

Forecast of Cause :

1. High pressure switch connector disconnection, open
2. High pressure switch characteristics failure
3. Inverter PCB failure

Check Point 1 : Check the high pressure switch connection state

- Connector and wiring connection state check
- Cable open check

↓ **OK**

Check Point 2 : Check the high pressure switch characteristics

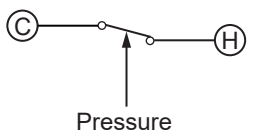
- Switch characteristics check
  * For the characteristics of high pressure switch, refer to below.

↓ **OK**

Check Point 3 : Replace Inverter PCB

- **Change Inverter PCB, and execute the check operation again.**

- Type of contact



- Characteristics of pressure switch (P770)

	Pressure switch
Contact : Short ⇒ Open	4.2±0.1MPa
Contact : Open ⇒ Short	3.2±0.15MPa

Troubleshooting 16-2 **OUTDOOR UNIT Error Method:** **Pressure sensor error**	**Indicate or Display:** **Hydraulic unit :** Green: ◆8 / Red: ◆6 ◆n : n times blinking **Outdoor unit :** Mode: ◆2 / Error: ● / L1: ◆8 / L2: ◆6 / L3: ○ / L4: ● / L5: ● / L6: ○ ○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Outdoor unit Main PCB Pressure sensor	30 seconds or more after power-on, when pressure sensor detection value detects the condition below continuously for 30 seconds or more. ・Ps ≦ 0 or Ps ≧ 5 [MPa]

Forecast of Cause :

1. Connector connection failure 2. Pressure sensor failure 3. Main PCB failure

Check Point 1 : Check connection of the Pressure sensor

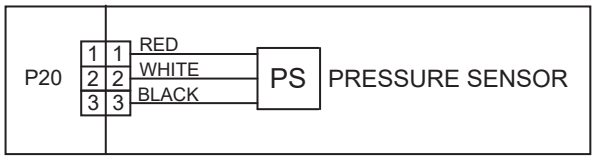
- Check if the terminal connection is loose.
- Check if connector is removed.
- Check if connector is erroneous connection.
- Check if cable is open.

>> Upon correcting the removed connector or mis-wiring, reset the power.

OK

Check Point 2 : Check output voltage of Main PCB

- Check voltage of Main PCB.
  (Measure at Main PCB side connector)
  >>1 pin(Red) - 3 pin(Black) DC5V ±5%

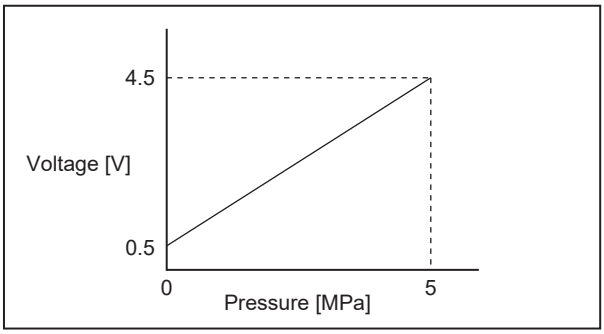


▶ **If the voltage is not correct, replace Main PCB.**

OK

Check Point 3 : Check output voltage of Pressure Sensor

- Check voltage of Main PCB.
  (Measure at Main PCB side connector)
  >>2 pin(White) - 3 pIn(Black) Voltage is refer to the following graph.



▶ **If the voltage is not correct, replace Presure Sensor.**

Troubleshooting 17 **OUTDOOR UNIT Error Method:** **Trip detection**	**Indicate or Display:** **Hydraulic unit :** Green: ◆9, Red: ◆4 ◆n : n times blinking **Outdoor unit :** Mode: ◆2, Error: ●, L1: ◆9, L2: ◆4, L3: ○, L4: ○, L5: ○, L6: ● ○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Outdoor unit Inverter PCB Outdoor unit Main PCB Compressor	・"**Protection stop** by overcurrent generation after inverter compressor start processing completed" generated consecutively 10 times. *The number of generations is reset if the start-up of the compressor succeeds.

Forecast of Cause :
1. Outdoor unit fan operation defective, foreign matter on hear exchanger, excessive rise of ambient temperature
2. Main PCB
3. Inverter compressor failure (lock, winding short)
4. Inverter PCB

Check Point 1 : Check the outdoor unit fan operation, heat exchanger, ambient temperature

・No obstructions in air passages?
・Heat exchange fins clogged
・Outdoor unit fan motor check
・Ambient temperature not raised by the effect of other heat sources?
・Discharged air not sucked in?

↓ **OK**

Check Point 2 : Replace Inverter PCB

▶ **If Check Point 1 do not improve the symptom, change Inverter PCB.**

↓ **OK**

Check Point 3 : Replace Main PCB

▶ **If Check Point 1,2 do not improve the symptom, change Main PCB.**

↓ **OK**

Check Point 4 : Replace Compressor

▶ **If Check Point 3 do not improve the symptom, change Compressor.**

Troubleshooting 18 **OUTDOOR UNIT Error Method:** **Compressor motor control error**	**Indicate or Display:** **Hydraulic unit :** Green: ◆9, Red: ◆5 ◆n : n times blinking **Outdoor unit :** Mode: ◆2, Error: ●, L1: ◆9, L2: ◆5, L3: ○, L4: ○, L5: ○, L6: ● ○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Outdoor unit Inverter PCB Outdoor unit Main PCB Compressor	"Protection stop by "overcurrent generation at inverter compressor starting" restart" generated consecutively 10 times x 3 sets (total 30 times)

Forecast of Cause :

1. Defective connection of electric components 2. Inverter PCB failure 3. Main PCB failure
4. Compressor failure

Check Point 1 : Check Noise from Compressor

・Turn on Power and check operation noise.

▶ **If an abnormal noise show, replace Compressor.**

OK

Check Point 2 : Check connection of around the Compressor components

For Compressor Terminal, Main PCB

・Check if connector is removed.
・Check erroneous connection.
・Check if cable is open. (Refer to PARTS INFORMATION 2)

>>Upon correcting the removed connector or mis-wiring, reset the power.

OK

Check Point 3 : Replace Inverter PCB

▶ **If Check Point 1, 2 do not improve the symptom, change Inverter PCB.**

OK

Check Point 4 : Replace Main PCB

▶ **If Check Point 3 do not improve the symptom, change Main PCB.**

OK

Check Point 5 : Replace Compressor

▶ **If Check Point 4 do not improve the symptom, change Compressor.**

Troubleshooting 19
OUTDOOR UNIT Error Method:

Outdoor Unit Fan Motor Error

Indicate or Display:

Hydraulic unit :

Green	Red
◆9	◆7

◆n : n times blinking

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆9	◆7	○	○	●	●

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:

Outdoor unit Inverter PCB
Outdoor unit Main PCB
Outdoor unit fan motor

Detective details:

① When outdoor fan rotation speed is less than 100rpm in 20 seconds after fan motor starts, fan motor stops.
② After fan motor restarts, if the same operation within 60sec is repeated 3 times in a row, compressor and fan motor stops.
③ If ① and ②repeats 5 times in a row, compressor and fan motor stops permanently.

Forecast of Cause:

1. Fan rotation failure
2. Motor protection by surrounding temperature rise
3. Inverter PCB failure
4. Main PCB failure
5. Outdoor unit fan motor failure

Check Point 1 : Check rotation of Fan

・Rotate the fan by hand when operation is off.
(Check if fan is caught, dropped off or locked motor)
>>If Fan or Bearing is abnormal, replace it.

OK

Check Point 2 : Check ambient temp. around motor

・Check excessively high temperature around the motor.
(If there is any surrounding equipment that causes heat)
>>Upon the temperature coming down, restart operation.

OK

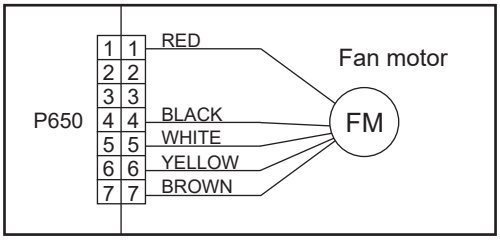
Check Point 3 : Check Outdoor unit fan motor

・Check Outdoor unit fan motor. **(PARTS INFORMATION 4)**
>>If Outdoor Fan Motor is abnormal, replace Outdoor fan motor and Main PCB.

OK

Check Point 4 : Check Output Voltage of Inverter PCB

・Check outdoor unit circuit diagram and the voltage. (Measure at Inverter PCB side connector)



Read wire	DC voltage
Red - Black	280V (AC220V-10%) ~ 373V (AC240+10%)
White - Black	15±1.5V

▶ **If the voltage is not correct, replace Inverter PCB.**

OK

Check Point 5 : Replace Main PCB

▶ **If Check Point 1~4 do not improve the symptom, change Main PCB.**

Troubleshooting 20
OUTDOOR UNIT Error Method:

Discharge Temperature Error

Indicate or Display:

Hydraulic unit :

Green	Red
◆10	◆1

◆n : n times blinking

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆10	◆1	○	○	○	●

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:

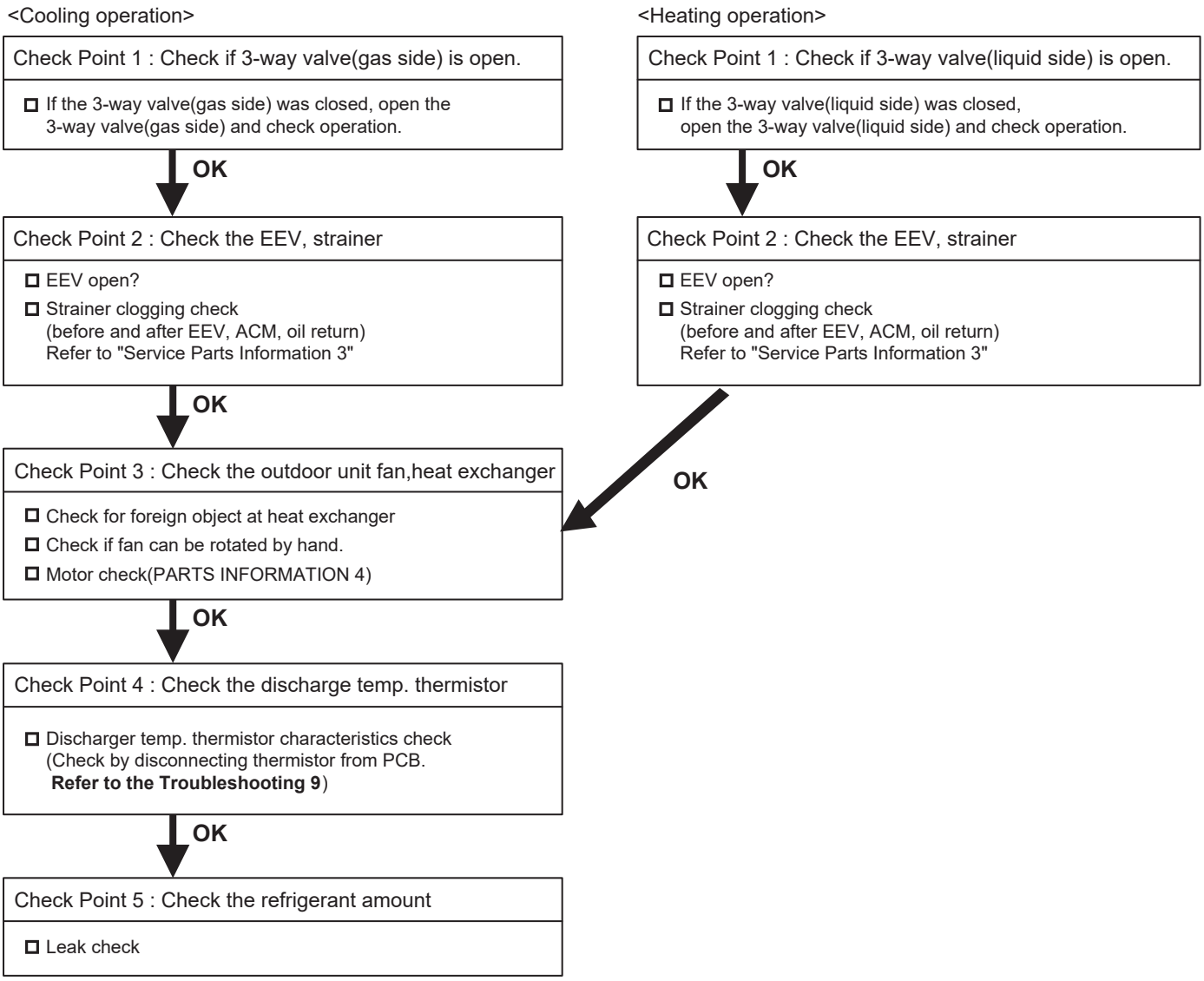
Discharge temperature thermistor

Detective details:

- "Protection stop by "discharge temperature ≧ 110°C during compressor operation"" generated 2 times within 24 hours.

Forecast of Cause :

1. 3-way valve not opened
2. EEV defective, strainer clogged
3. Outdoor unit operation failure, foreign matter on heat exchanger
4. Discharge temperature thermistor failure
5. Insufficient refrigerant

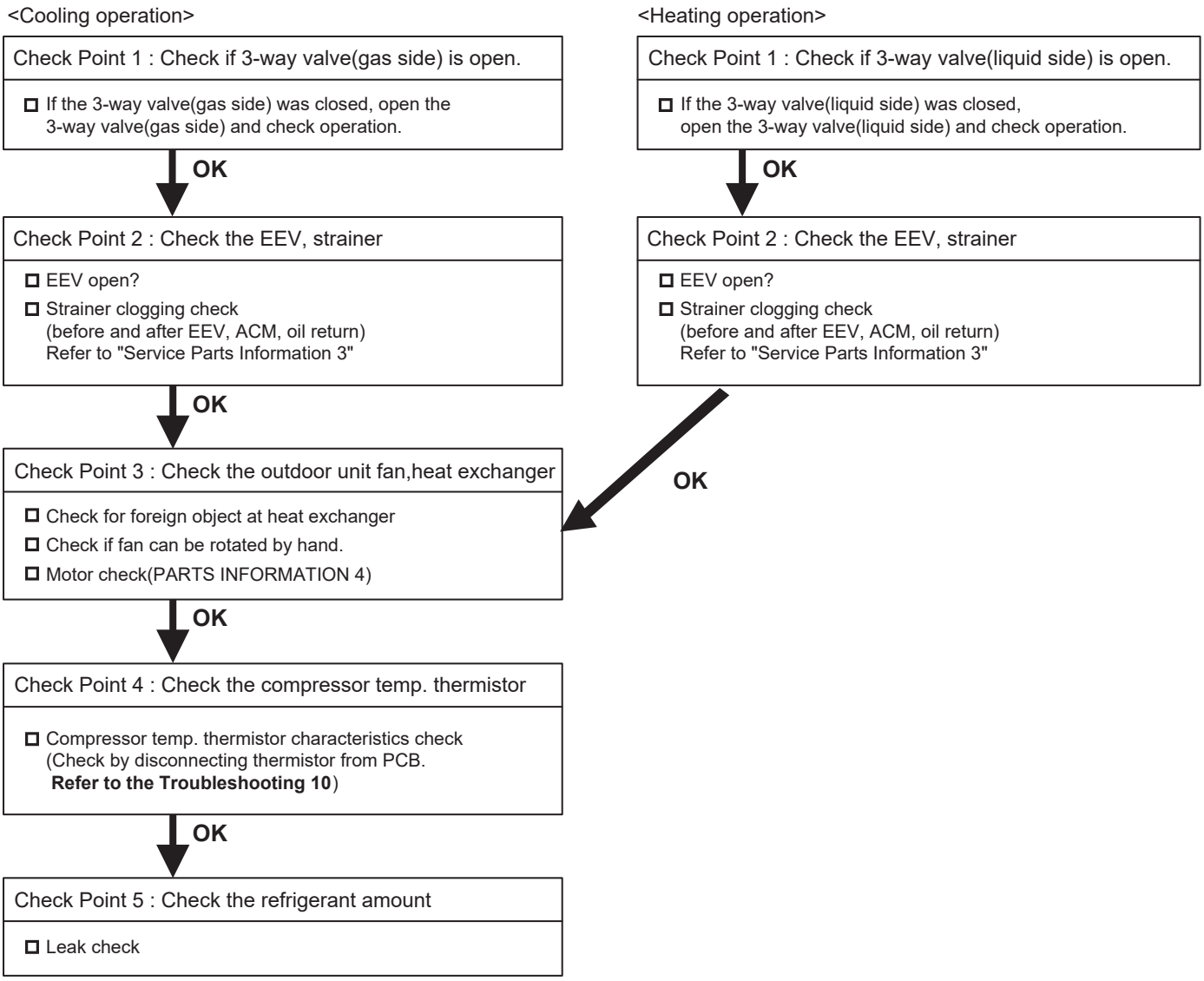


Troubleshooting 21 **OUTDOOR UNIT Error Method:** **Compressor Temperature Error**	**Indicate or Display:** **Hydraulic unit :** Green: ◆10 / Red: ◆3 ◆n : n times blinking **Outdoor unit :** Mode: ◆2 / Error: ● / L1: ◆10 / L2: ◆3 / L3: ○ / L4: ○ / L5: ○ / L6: ● ○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:	**Detective details:**
Compressor temperature thermistor	▪ "Protection stop by "compressor temperature ≧ 108°C during compressor operation"" generated 2 times within 24 hours.

Forecast of Cause :

1. 3-way valve not opened
2. EEV defective, strainer clogged
3. Outdoor unit operation failure, foreign matter on heat exchanger
4. Compressor temperature thermistor failure
5. Insufficient refrigerant



Troubleshooting 22
OUTDOOR UNIT Error Method:

Pressure Error

Indicate or Display:

Hydraulic unit :

Green	Red
◆10	◆5

◆n : n times blinking

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆10	◆5	○	○	○	●

○: Light OFF ●: Light ON ◆n : n times blinking

Detective Actuators:

Pressure sensor

Detective details:

- "Protection stop by suction pressure ≦ 0.02MPa continued for 5 minutes" repeats 5 times within 2 hours.

Forecast of Cause :

1. 3-way valve not opened
2. Outdoor unit ambient temperature too low
3. Outdoor unit fan operation defective, foreign matter at heat exchanger
4. EEV defective, strainer clogged
5. Solenoid valve defective
6. Low pressure sensor characteristics defective
7. Insufficient refrigerant

<Cooling operation>

Check Point 1 : Check if 3-way valve(gas side) is open.

- ☐ If the 3-way valve(gas side) was closed, open the 3-way valve(gas side) and check operation.

↓ OK

Check Point 2 : Check the EEV, strainer clogging

- ☐ EEV operation check
- ☐ Strainer not clogged?

↓ OK

Check Point 5 : Check the solenoid valve (SV1)

- ☐ Solenoid valve operation check

↓ OK

Check Point 6 : Check the suction pressure sensor

- ☐ Suction pressure sensor characteristics check.
  * For the characteristics of the suction pressure sensor.

↓ OK

Check Point 7 : Check the refrigerant amount

- ☐ Leak check

<Heating operation>

Check Point 1 : Check if 3-way valve(liquid side) is open.

- ☐ If the 3-way valve(liquid side) was closed, open the 3-way valve(liquid side) and check operation.

↓ OK

Check Point 2 : Check the outdoor unit ambient temperature

- ☐ Outdoor ambient temperature lower than operating range?

↓ OK

Check Point 3 : Check the outdoor unit fan operation, heat exchanger

- ☐ No foreign oblect in air passage?
- ☐ Heat exchange fins clogged
- ☐ Fan rotates?
- ☐ Outdoor unit fan motor check

↓ OK

Check Point 4 : Check the outdoor unit EEV, strainer clogging

- ☐ Outdoor unit EEV operation check
- ☐ Strainer not clogged?

← Check Point 5

Troubleshooting 23

OUTDOOR UNIT Error Method:

Heatsink Temperature Error

Indicate or Display:

Hydraulic unit :

Green	Red
◆10	◆12

◆n : n times blinking

Outdoor unit :

Mode	Error	L1	L2	L3	L4	L5	L6
◆2	●	◆10	◆12	○	○	●	●

○ : Light OFF ● : Light ON ◆n : n times blinking

Detective Actuators:

Outdoor unit Inverter PCB
Heatsink temperature thermistor

Detective details:

- "Protection stop by "heatsink temp. ≧ 80°C""
  generated 2 times within 24 hours.

Forecast of Cause :

1. Foreign matter on heat sink, heat sink dirty
2. Foreign matter on heat exchanger, excessive ambient temperature rise
3. Heatsink temp. thermistor defective

Check Point 1 : Check the heatsink state

- ☐ Heatsink foreign matter, soiling check

OK

Check Point 2 :
Check the foreign matter and ambient temperature of heat exchanger

- ☐ Heat exchange foreign matter check
- ☐ Ambient temperature not raised by effect of other heat sources?
- ☐ Discharged air not sucked in?

OK

Check Point 3 : Check the heatsink temp. thermistor

- ☐ Heatsink temp. thermistor characteristics check
  (Check by disconnecting thermistor from PCB.
  Refer to the Troubleshooting 13)

OK

Check Point 4 : Replace Inverter PCB

- ☐ Replace Inverter PCB

Troubleshooting 24

Outdoor unit - No Power

Forecast of Cause:

1.Power Supply failure 2. External cause
3.Electrical Components defective

Check Point 1 : Check Installation Condition

- Isn't the breaker down?
- Check loose or removed connection cable.

>>If abnormal condition is found, correct it by referring to Installation Manual or Data & Technical Manual.

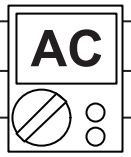
OK

Check Point 2 : Check external cause at Hydraulic unit and Outdoor unit (Voltage drop or Noise)

- Instant drop ----- Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure ----- Check if there is a defective contact or leak current in the power supply circuit.
- Noise ----- Check if there is any equipment causing harmonic wave near electric line.
  (Neon bulb or electric equipment that may cause harmonic wave)
  Check the complete insulation of grounding.

OK

Check Point 3 : Check Electrical Components



- Check the voltage of power supply.

>> Check if AC198 - 264V appears at Outdoor unit Terminal L - N.

NO

YES

- Check Fuse in Main PCB.

>> If Fuse is open, check if the wiring between Terminal and Main PCB is loose, and replace Fuse.

OK

▶ **If the symptom does not change by above Check 3, replace Main PCB.**

Troubleshooting 25

No Operation (Power is ON)

Forecast of Cause:

1. Setting/ Connection failure 2. External cause
3. Electrical Component defective

Check Point 1 : Check hydraulic unit and outdoor unit installation condition

- Are these hydraulic unit and outdoor unit suitable model numbers to connect?

>> If there is some abnormal condition, correct it by referring to Installation manual and Data & Technical Manual.

OK

Turn off Power and check/ correct followings.

- Is there loose or removed communication line of hydraulic unit and outdoor unit?

OK

Check Point 2 : Check external cause on units (Voltage drop or Noise)

- Instant drop ----- Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure ----- Check if there is a defective contact or leak current in the power supply circuit.
- Noise ----- Check if there is any equipment causing harmonic wave near electric line.
  (Neon bulb or electric equipment that may cause harmonic wave)
  Check the complete insulation of grounding.

>> If the symptom does not change by above check 1, 2 replace Main PCB of outdoor unit.

Troubleshooting 26

No Cooling / No Heating

Forecast of Cause:

1. Hydraulic Unit error 2. Outdoor Unit error
3. Effect by Surrounding environment
4. Connection Pipe / Connection Wire failure 5. Refrigeration cycle failure

Check Point 1 : Check Outdoor Unit Operation

- Check if Outdoor Unit is operating
- Check any objects that obstruct the air flow route.
- Check clogged Heat Exchanger.
- Is the Valve open?

OK

Check Point 2 : Check Site Condition

- Is capacity of Hydraulic unit fitted to Room size?
- Any windows open? Or direct sunlight ?

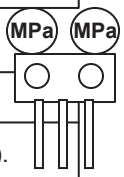
OK

Check Point 3 : Check Hydraulic unit/ Outdoor unit Installation Condition

- Check connection pipe (specified pipe length & Pipe diameter?)
- Check any loose or removed communication line.

>> If there is an abnormal condition, correct it by referring to Installation Manual or Data & Technical Manual.

OK



Check Point 4 : Check Refrigeration cycle

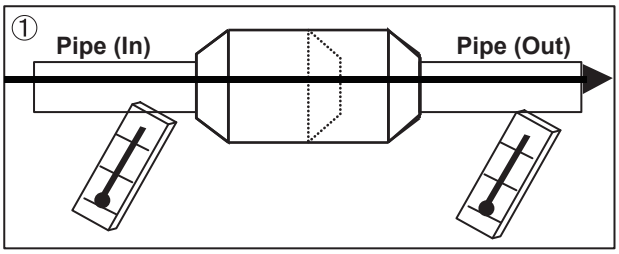
- Check if Strainer is clogged (Refer to the figure at right).
- Measure Gas Pressure and if there is a leakage, correct it.

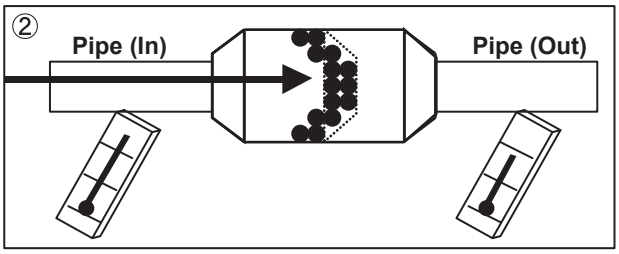
>> When recharging the refrigerant, make sure to perform vacuuming, and recharge the specified amount.

- Check EEV (PARTS INFORMATION 3)
- Check Compressor (PARTS INFORMATION 1,2)

Attention

Strainer normally does not have temperature difference between inlet and outlet as shown in ①, but if there is a difference like shown in ②, there is a possibility of inside clogged. In this case, replace Strainer.





Troubleshooting 27

Abnormal Noise (Outdoor)

Forecast of Cause :

1. Abnormal installation
2. Fan failure
3. Compressor failure

Diagnosis method when Abnormal Noise is occurred

- Is Main Unit installed in stable condition?
- Is Fan Guard installed normally?

OK

- Is Fan broken or deformed?
- Is the screw of Fan loose?
- Is there any object which obstruct the Fan rotation?

OK

- Check if vibration noise by loose bolt or contact noise of piping is happening.

OK

- Is Compressor locked?
  >> Check Compressor (PARTS INFORMATION 1,2)

SERVICE PARTS INFORMATION 1

Compressor

Diagnosis method of Compressor (If Outdoor Unit LED displays Error, refer to Troubleshooting)

Does not start up

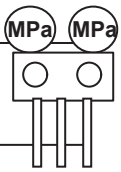
- Is there open or loose connection cable?
- Check Main PCB, connection of Compressor, and winding resistance. (Refer to the next page).

>> If there is no failure, the defect of Compressor is considered (Locked compressor due to clogged dirt or less oil)

Replace Compressor

Stops soon after starting up

- Is there open or loose connection cable?
- Is Gas pipe valve open? (Low pressure is too low)
- Check if Refrigerant is leaking. (Recharge Refrigerant)



- Check if capillary tube, strainer is clogged. (PARTS INFORMATION 3)
- Check Main PCB, connection of Compressor,and winding resistance. (Refer to the next page).

>> If there is no failure, the defect of Compressor can be considered. (Compression part broken or valve defective.)

Replace Compressor

Abnormal noise

- Check if vibration noise by loose bolt or contact noise of piping is happening.

▶Defective Compressor can be considered. (due to inside dirt clogging or broken component)

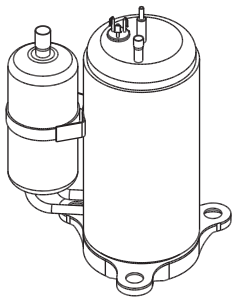
Replace Compressor

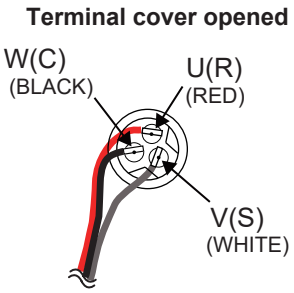
SERVICE PARTS INFORMATION 2

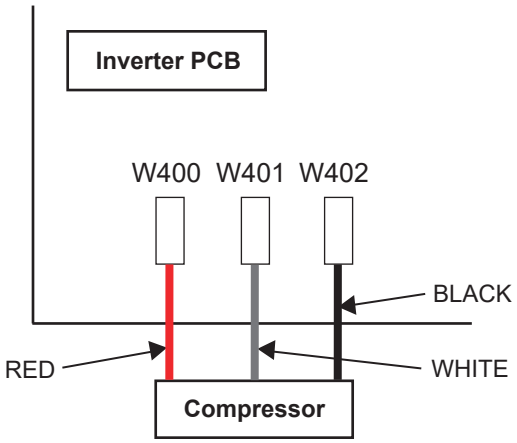
Inverter Compressor

Check Point 1 : Check Connection

・Check terminal connection of Compressor
(loose or incorrect wiring)

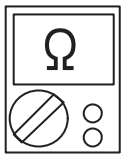


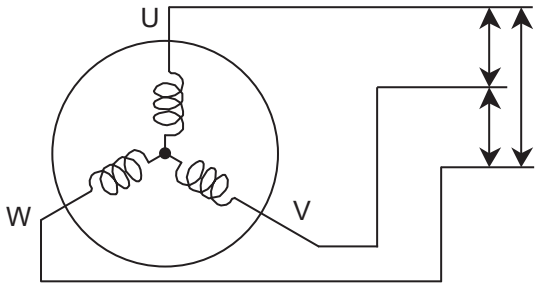




Check Point 2 : Check Winding Resistance

・Check winding resistance of each terminal
▶**If the resistance value is 0Ω or infinite, replace Compressor.**





Resistance Value :
0.766Ω at 20°C

Check Point 3 : Replace Invereter PCB

▶**If the symptom does not change with above Check 1, 2, replace Inverter PCB.**

Check Point 4 : Replace Main PCB

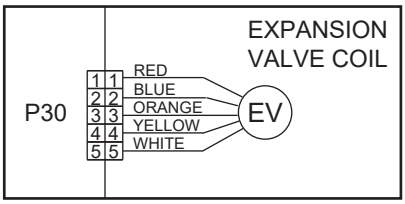
▶**If the symptom does not change with above Check 1~3, replace Main PCB.**

SERVICE PARTS INFORMATION 3

Outdoor unit Electronic Expansion Valve
(EEV)

Check Point 1 : Check Connections

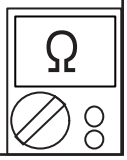
・Check connection of connector
(Loose connector or open cable)



Check Point 2 : Check Coil of EEV

・Remove connector, check each winding resistance of Coil.

Read wire	Resistance value
White - Red	**46**Ω ± **4**Ω at 20°C
Yellow - Red	
Orange - Red	
Blue - Red	



▶ **If Resistance value is abnormal, replace EEV.**

Check Point 3 : Check Noise at start up

▪ Turn on Power and check operation noise.

▶ **If an abnormal noise does not show, replace Main PCB.**

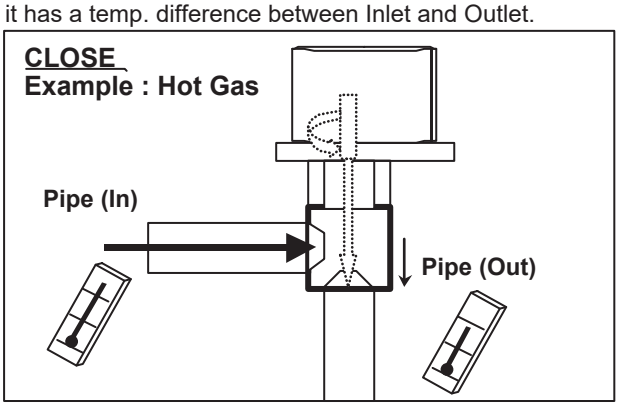
Check Point 4 : Check Voltage from Main PCB.

▪ Remove Connector and check Voltage (DC12V)

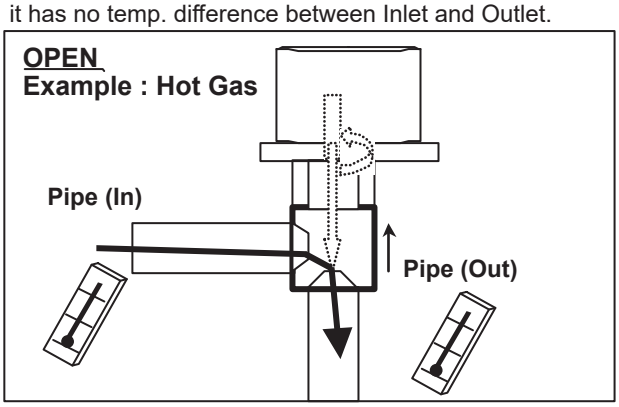
▶ **If it does not appear, replace Main PCB.**

Check Point 5 : Check Opening and Closing Operation of Valve

When Valve is closed,
it has a temp. difference between Inlet and Outlet.

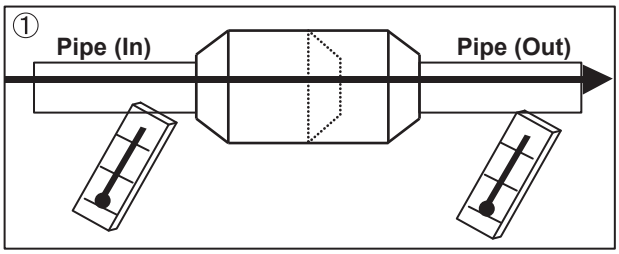


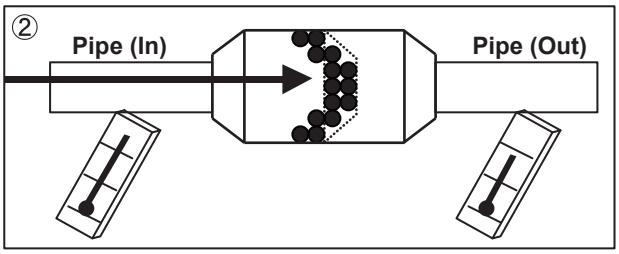
If it is open,
it has no temp. difference between Inlet and Outlet.



Check Point 6 : Check Strainer

Strainer normally does not have temperature difference between inlet and outlet as shown in ①,
but if there is a difference as shown in ② , there is a possibility of inside clogged. In this case, replace Strainer.





SERVICE PARTS INFORMATION 4

Outdoor unit fan motor

Check Point 1 : Check rotation of Fan

・Rotate the fan by hand when operation is off.
(Check if fan is caught, dropped off or locked motor)
>>If Fan or Bearing is abnormal, replace it.

Check Point 2 : Check resistance of Outdoor Fan Motor

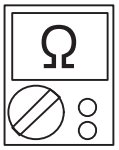
・Refer to below. Circuit-test "Vm" and "GND" terminal.
(Vm: DC voltage, GND: Earth terminal)
>>If they are short-circuited (below 300 kΩ), replace Outdoor fan motor and Main PCB.

Pin number (wire color)	Terminal function (symbol)
1 (Red)	DC voltage (Vm)
2	No function
3	No function
4 (Black)	Earth terminal (GND)
5 (White)	Control voltage (Vcc)
6 (Yellow)	Speed command (Vsp)
7 (Brown)	Feed back (FG)

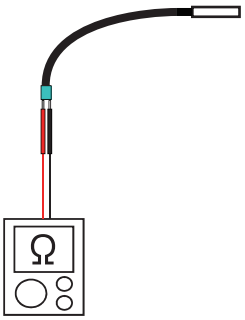
SERVICE PARTS INFORMATION 5

Thermistor

Check Point : Check Thermistor resistance value



☐ Remove connector and check Thermistor resistance value.



Temperature [°C]	Resistance Value [kΩ]			
	Thermistor A	Thermistor B	Thermistor C	Thermistor D
-30	1013.1	95.6	224.3	94.3
-20	531.6	50.3	115.2	49.6
-10	292.9	27.8	62.3	27.4
0	168.6	16.1	35.2	15.8
10	100.9	9.6	20.7	9.5
20	62.5	6.0	12.6	5.9
30	40.0	3.8	8.0	3.8
40	26.3	2.5	5.2	2.5
50	17.8	1.7	3.5	1.7
60	12.3	1.2	2.4	1.2
70	8.7	0.8	---	0.8
80	6.3	0.6	---	0.6
90	4.6	---	---	0.4
100	3.4	---	---	0.3
110	2.6	---	---	0.2
120	2.0	---	---	0.2
130	---	---	---	0.1
140	---	---	---	0.1
150	---	---	---	0.1
Applicable Thermistors	Discharge temp. TH Compressor temp. TH Ex. valve temp. TH	Heat exchanger. TH	Outdoor temp. TH	Heatsink temp. TH

REFRIGERANT R32
INVERTER

WATERSTAGE™
INNOVATIVE SOLUTION OF DOMESTIC HEATING

4. FIELD WORKING

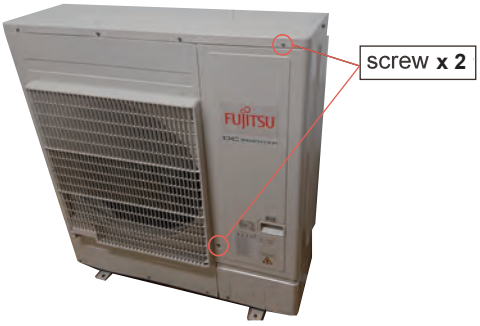
2021.03.01
SA_CH04_CF003EF_01

1. Disassembly Process of Outdoor Unit

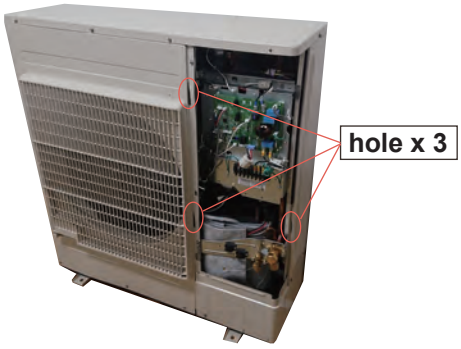
7.1 WOYA100KLT and WOHA100KLT

7.1.1 Appearance

7.1.2 SERVICE PANEL removal

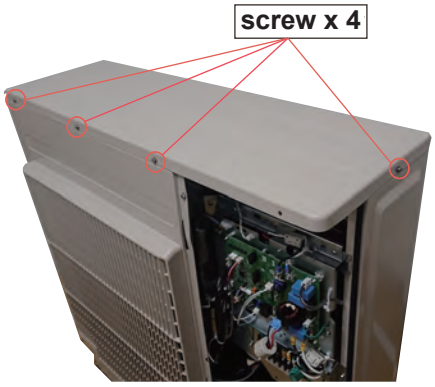


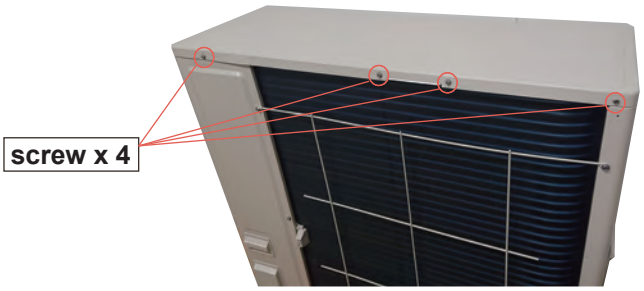
Remove the mounting screws



Remove the service panel by sliding downward

7.1.3 TOP PANEL removal

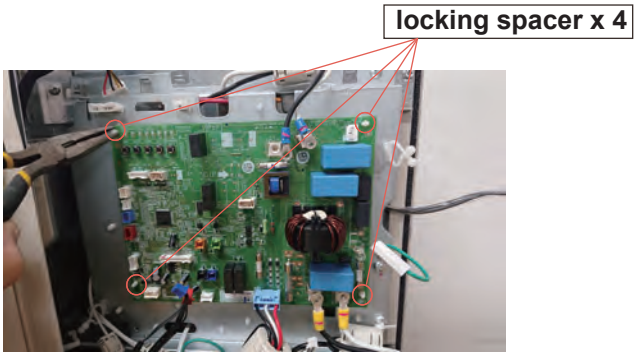




Remove the mounting screws and the top panel

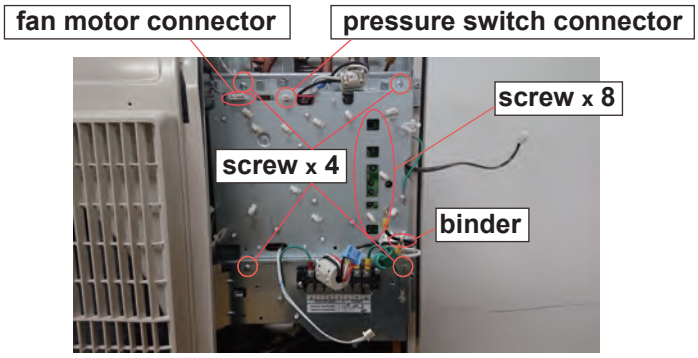
7.1.4 MAIN PCB removal

Remove the connectors and the wires

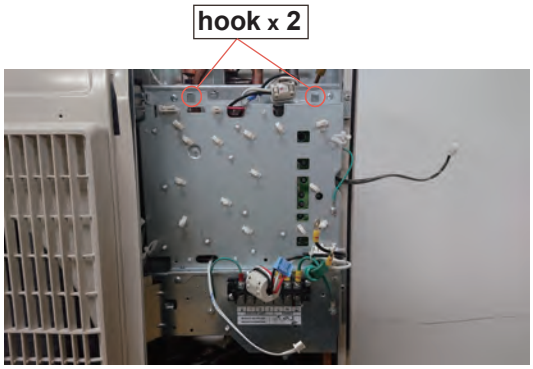


Remove the main PCB

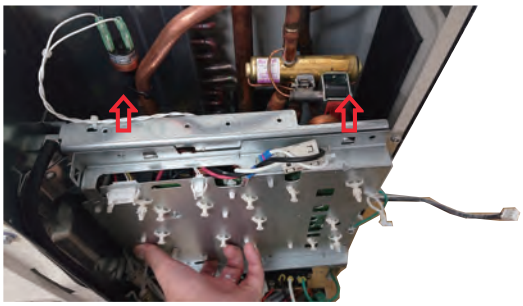
7.1.5 INVERTER PCB removal



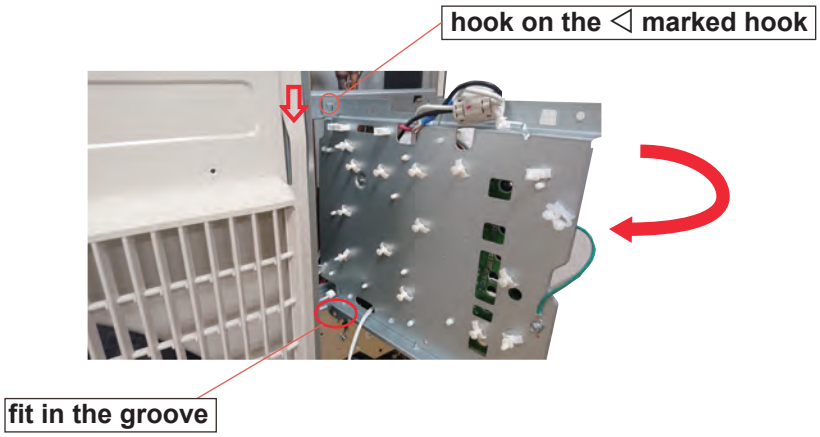
Remove the mounting screws
Remove the binder (don't cut)
Remove the fan motor connector and the pressure switch connector



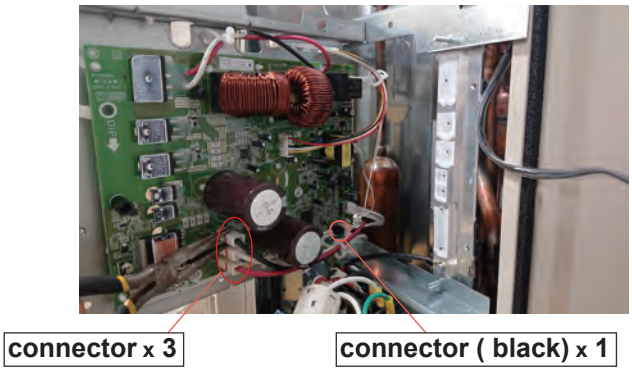
Change the direction of holder (step 1)



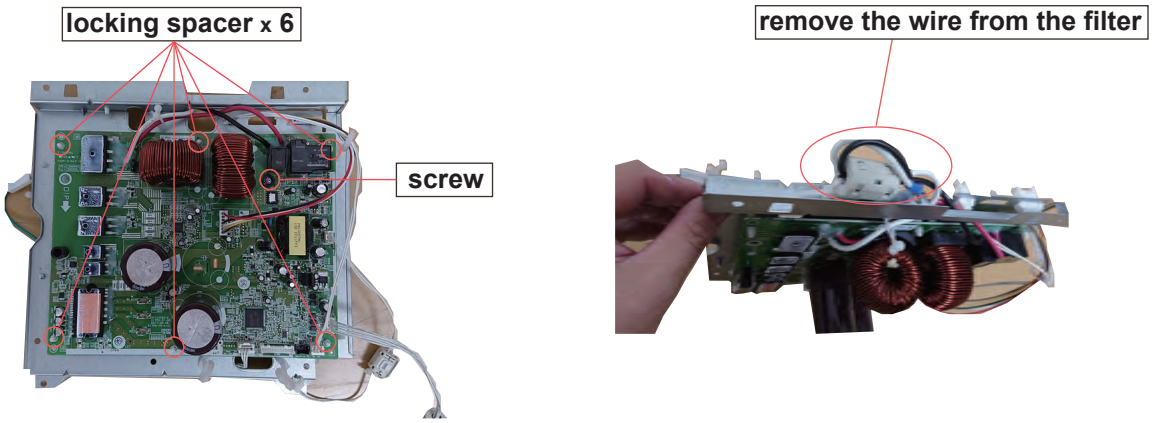
Change the direction of holder (step 2)



Change the direction of holder (step 3)

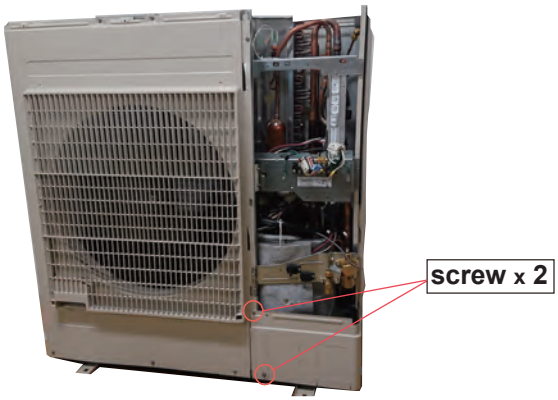


Remove the connector 4 places

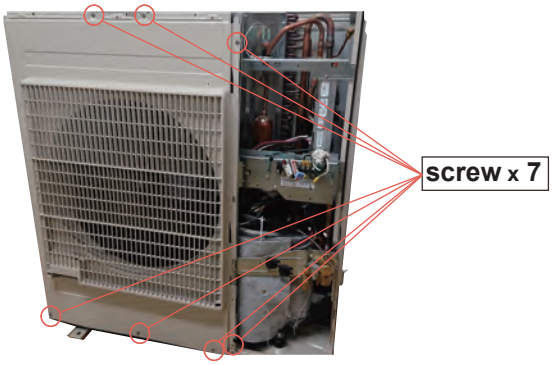


Remove the connectors and the wires
Remove the inverter PCB

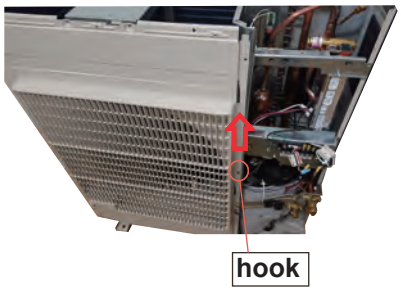
7.1.6 FRONT PANEL removal

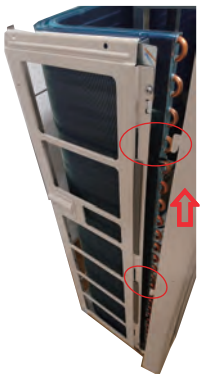


Remove the front pipe cover



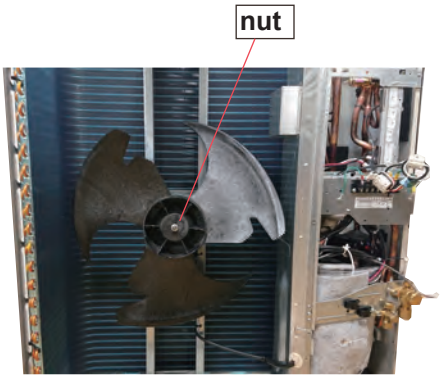
Remove the mounting screws



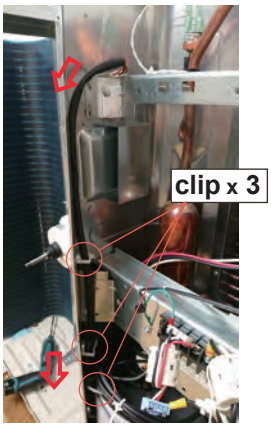


Remove the front panel

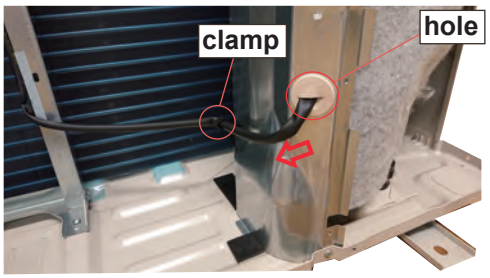
7.1.7 FAN MOTOR removal



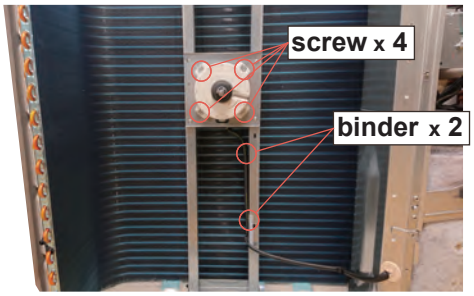
Remove the fan nut and the propeller fan



Remove the fan motor lead wire

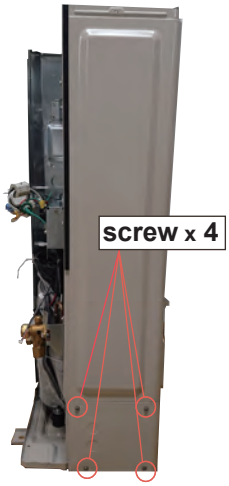


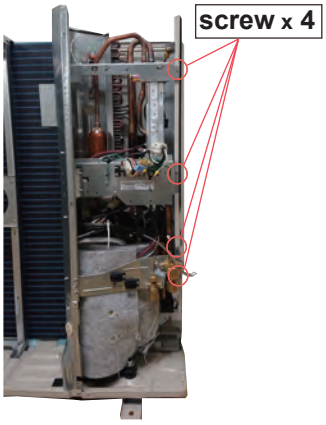
Remove the fan motor lead wire
Loose the clamp

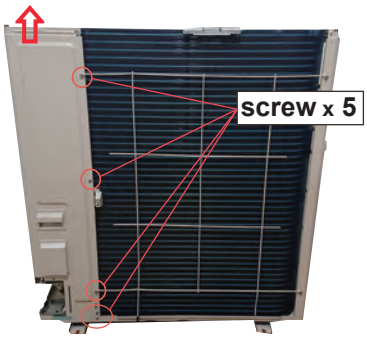


Remove the mounting screws
Cut the binders

7.1.8 RIGHT PANEL removal



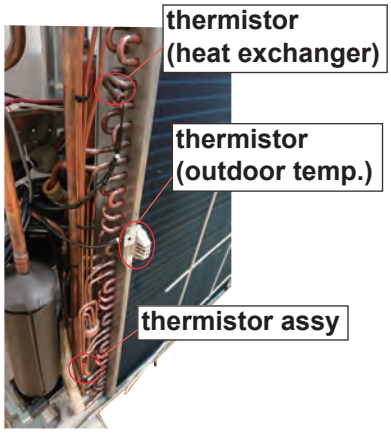




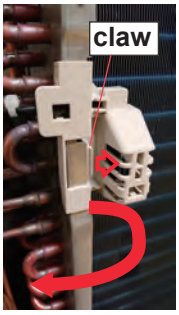
Remove the mounting screws
Remove the rear pipe cover

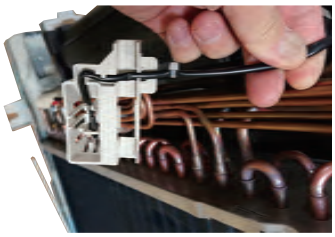
Remove the mounting screws
Remove the right panel by sliding upward

7.1.9 THERMISTOR removal

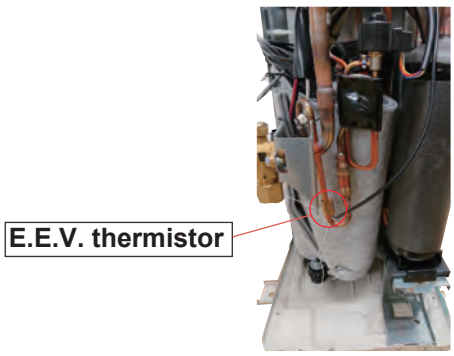


Remove the thermistor



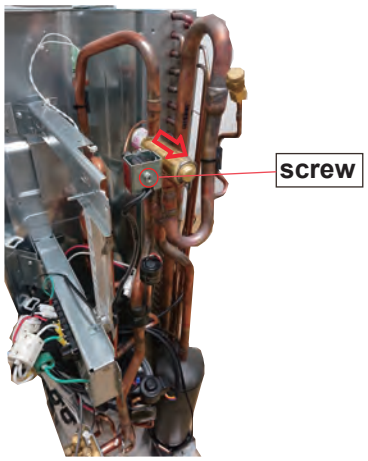


Remove the thermistor
(outdoor temp.)



Remove the E.E.V. thermistor

7.1.10 SOLENOID COIL (4-WAY VALVE) remove

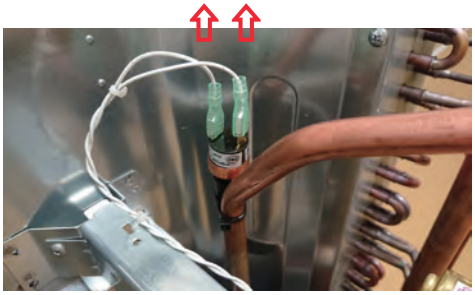


Remove the mounting screw
Remove the solenoid coil

7.1.11 E.E.V. COIL remove

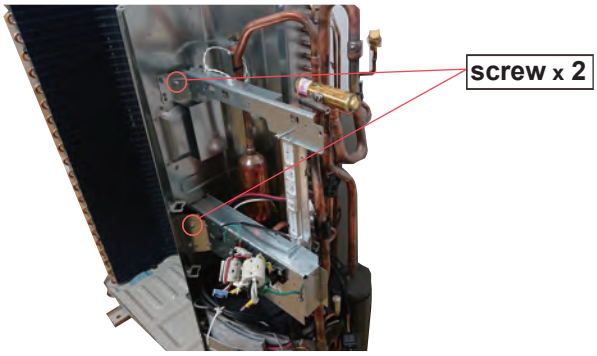
Remove the E.E.V. coil by hand

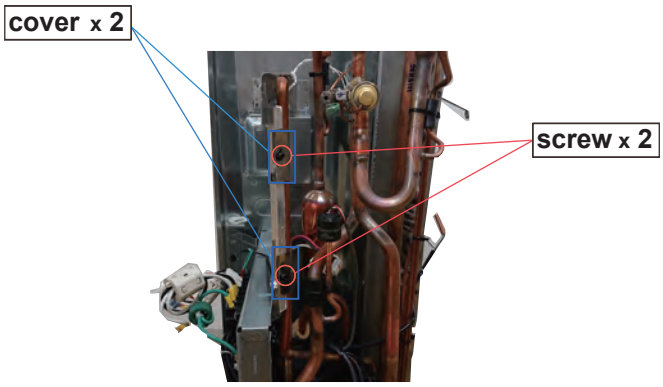
7.1.12 PRESSURE SWITCH remove



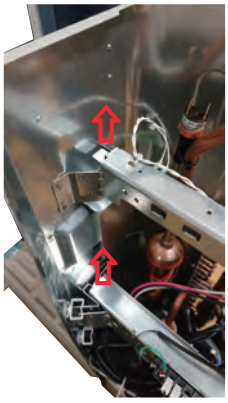
Remove the connectors

7.1.13 PCB HOLDER removal





Remove the mounting screws
Remove the covers



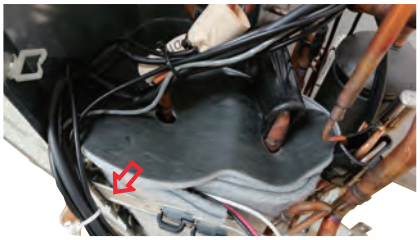
Lift up the PCB holder

Remove the binder at the PCB holder (Don't cut)

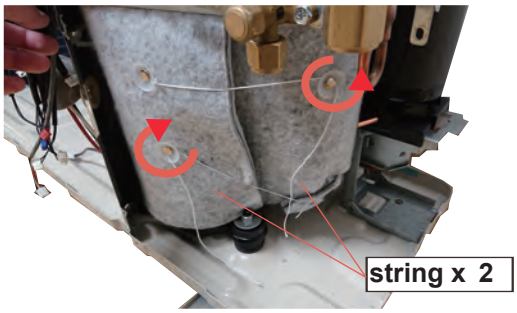
7.1.14 COMPRESSOR removal

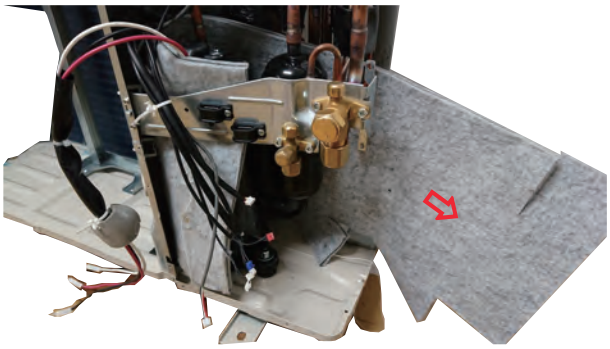
Precautions for exchange of compressor.
Do not allow moisture or debris to get inside refrigerant pipes during work.

Procedure for compressor removal.
1.Turn off the power.
2.Remove the TOP PANEL, FRONT PANEL and RIGHT PANEL ASSY.
3.Collect the refrigerant from the 3-way valve (gas) and 3-way valve (liquid).
4.Start the following work after completely collecting the refrigerant.
Do not reuse the refrigerant that has been collected.

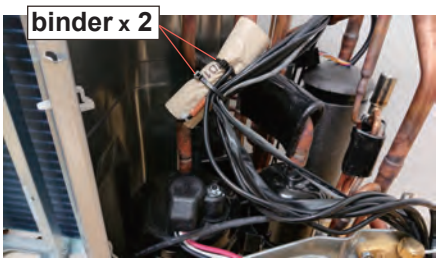


Remove the sound insulation unit (top)





Remove the sound insulation unit (body)



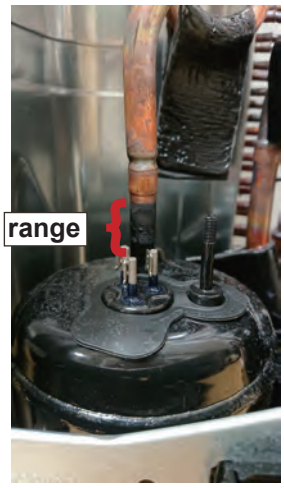
Cut the binder 2 places
Remove the insulation

Remove the thermistor (discharge)

Remove the thermistor (comp. temp.)

Remove the terminal cover

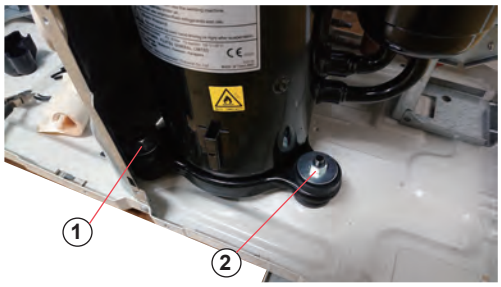
Remove the connectors
[R(U):red, T(W):black, S(V):white]

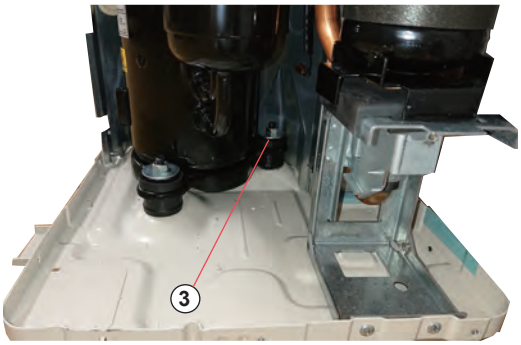


Cut the discharge pipe in this range

Cut the suction pipe in this range

Caution
Keep their shape better.
There is a possibility of catching fire to oil when removing by the welding without cutting it.





Remove the special nut 3 places
Remove the compressor

Procedure for compressor installation
Reverse procedure to removing the compressor

Precautions for installation of compressor.
1.When brazing, do not apply the flame to the terminal.
2.When brazing, be sure to replace the air in the pipe with nitrogen gas to prevent forming oxidization scale.

Precautions for exchange of refrigerant-cycle-parts
(1)During exchange the following parts shall be protected by wet rag and not make the allowable temperature or more.
(2)Remove the heat insulation when there is the heat insulation near the welding place.
Move and cool it when its detaching is difficult.
(3)Cool the parts when there are parts where heat might be transmitted besides the replacement part.
(4)Interrupt the flame with the fire-retardant board when the flame seems to hit the following parts directly.
(5)Do not allow moisture or debris to get inside refrigerant pipes during work.
(6)When brazing, be sure to replace the air in the pipe with nitrogen gas to prevent forming oxidization scale.

Part name	Allowble temperature	Precautions in work
4-WAY VALVE	120 ℃	Remove the coil before brazing. And install the coil after brazing.
EXPANSION VALVE	120 ℃	Remove the coil before brazing. And install the coil after brazing.
CHECK JOINT	120 ℃	
PRESSURE SWITCH	100 ℃	Tighten the flare part gripping it. (Tightening torque:12 1.5N m) Do the static electricity measures.
3-WAY VALVE (GAS) 3-WAY VALVE(LIQUID)	120 ℃	